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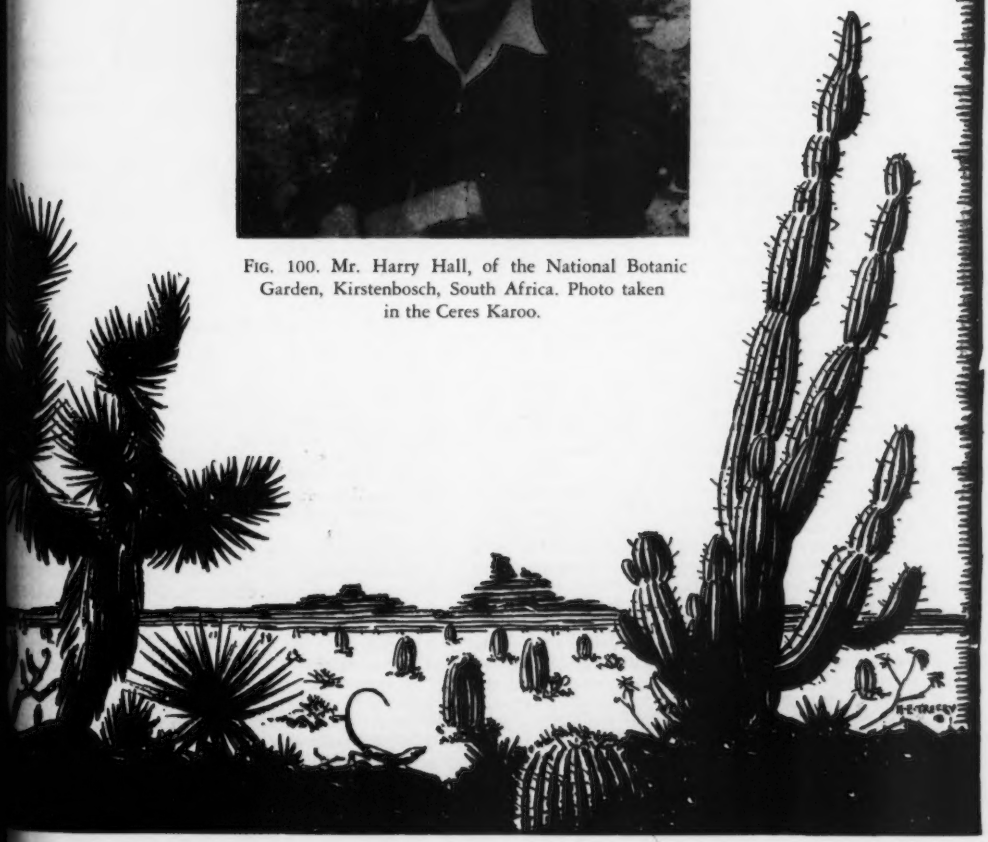
Vol. XXVIII SEP.-OCT., 1956 No. 5

FIG. 100. Mr. Harry Hall, of the National Botanic Garden, Kirstenbosch, South Africa. Photo taken in the Ceres Karoo.



CACTUS AND SUCCULENT JOURNAL

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NEWS FROM THE RESEARCH BOARD

The Research Board, Committee for Plant Distribution, of the Cactus and Succulent Society of America Inc., is offering a first group of plants through a new service to the members of the Society. There are a few requirements that must be fulfilled by those who request these plants.

First: The primary purpose of the Society in making these plant distributions to you is to place these plants in the collections of as many growers as possible in order to have the plants become better known.

Second: With the granting of these plants to you, it becomes your responsibility to propagate and distribute these plants to other interested growers. Always remember that you must retain and use the number which accompanies each plant as this is the most important link to the records on the plants, all of which are surplus material from the University of California Botanical Garden, Berkeley.

Third: Approximately every six months you are required to send a postcard to the Research Board giving a short report of your success with the plants and listing approximately how many plants or cuttings of each species you have distributed during the six months just past, and also if any of the plants have died. You should also ask the persons to whom you give the plants to keep you informed of their results so you can report to the Research Board.

The plants requested will be issued on a basis of "first come, first served" and not more than one plant of each species will be sent to any one member. A charge of 50¢ will be made for each plant to cover the cost of packaging and mailing and the money must accompany the request. It has been suggested that you make one or two alternate plant choices in case the plants you request are already gone.

Success of this service depends entirely upon the support and co-operation of all the members of the Cactus and Succulent Society of America, and if this cooperation is given freely there will be many rare and very much desired species of plants made available as fast as they can be made ready for distribution.

Send your list of choices with a sufficient remittance, to the Research Board, 820 W. 115th St., Los Angeles 44, Calif. Remember that this service is a case of the first request receiving the first choice.

The Research Board
Homer G. Rush, Chairman
820 West 115th Street
Los Angeles 44, California

LIST OF PLANTS NOW AVAILABLE

4 Adromischus grandiflorus	50.2076
8 Villadia batesii	54.170
5 Eulychnia iquiquensis	52.593
20 Eulychnia castanea	52.548
4 Neoporteria jussieui	52.586S
5 Parodia comarapana	54.408
14 Aloe cameronii	54.465
4 Aloe albiflora X Aloe parvula	
1 Aloe peglerae	53.1238
1 Aloe calidophila	54.127
3 Aloe millottii	53.348-2
6 Cotyledon (?) ladismithensis	50.2111
16 Aeonium caespitosum	51.898
6 Aeonium spathulatum	51.895
2 Monanthes subcrassicaulis	54.368
4 Monanthes brachycaulon	51.904
5 Haworthia reinwardtii var. chalumnensis	50.2198
3 H. reinwardtii var. tenuis	52.1211
14 H. janseana	52.1896
6 H. angustifolia var. liliputana	53.536
12 H. caespitosa	50.1542
5 H. cymbiformis var. obtusa	49.1669
2 H. mirabilis	49.1633
1 H. ubomboensis	49.2010
5 H. ramosa	53.1140
1 H. marumiana	52.1895
1 H. viscosa var. caespitosa	53.372
2 Astroloba skinneri	52.1330
16 Sinocrassula indica var. yunnanense	51.306
3 Sempervivella alba	52.351

FIG. 101. Orange River, Goodhouse, Feb., 1952, returning from an expedition to the Fish River Canyon in South West Africa. Photo by H. Hall.

PLANT HUNTING IN SOUTH WEST AFRICA

By HARRY HALL

National Botanic Garden, Kirstenbosch, South Africa

Most of my spare time is spent in exploring the veld and the chance to make another trip to South West Africa, last year, was keenly anticipated because the possibilities of collecting some of the territory's species of *Lithops* was something I had dreamed of for a very long time. The trip was made possible by my friend and explorer Bernard Carp, with whom I have travelled many thousands of miles during the past six years. Bernard is well known for his expeditions into little explored regions of Southern Africa and thanks to him I have been able to collect some little known plants, mainly succulents. In 1951, for example, we spent six weeks in the Kaokoveld, a region in the far north west corner of South West Africa, fringed by the Namib Desert in the west and the Angola border in the north. Some of the photographs were taken in that region, a fascinating land of arid plains and picturesque mountain landscapes. As the Kaokoveld is a native reserve, permits to enter it are difficult to obtain. There I saw some of Southern Africa's big game: elephant, rhinoceros, hippopotami, giraffe, zebra, etc., in their truly wild and unspoilt setting. The following year we visited the Fish River Canyon in the southern portion of South West Africa, a spectacular, 2,000 ft. deep cleft in most arid surroundings. Near here I saw *Lithops fulviceps* for the first time in the wild, exactly the colour and *apparent* texture of the granite in which it grew. In the Kaokoveld, by the way, I collected *Lithops lineata,* more than a hundred miles further north than any other known locality,

Editor's Note: For many fine photos of *Lithops* mentioned in this article see Vol. XXIII, No. 1, of this Journal, also "Succulents for the Amateur" J. R. Brown and "Mesembryanthema" Brown, Tischer & Karsten.

and not many miles from the Angola border.

My two previous trips to S. W. Africa had simply whetted my appetite for the more arid (coastal) areas of what is largely semi-arid country, and in May, 1955, Bernard and I were able to plan a fairly extensive tour. According to plan, therefore, we reached Windhoek, the Capital, in three days—it is about a thousand miles from the Cape—and it is obvious that little time was spent in plant-hunting on the way. Near the little town of Grunau, however, we saw a small ridge of white quartz and there, huddled in the white ground, saw *Lithops karasmontana,* incredibly camouflaged and flush with the surface, as are most *Lithops,* of course. Amongst them were numerous specimens of *Crassula mesembryanthemopsis,* also level with the ground, their rosette of leaves resembling some *Titanopsis* much more than a conventional *Crassula.* In fissures of larger masses of white rock grew a species of *Huernia* with large creamy yellow flowers which I have not been able to recognise. Not a cloud marred the serene blue sky, and the quartz hillock stood out against the sky not unlike a snow-covered distant mountain. These quartz outcrops are quite unique and invariable contain species of succulents found in no other situation. In the south, of course, one crosses vast semi-arid plains thinly covered with a soft, silky grass in parts, a desert grass which once fed the countless hordes of Springbuck, now reduced to scattered, smaller herds where they are preserved from complete extermination. As we approached Windhoek the land became more hilly. There a greater rainfall is responsible for tree types, mainly *Acacia* spp. In Windhoek we met several old acquaintances who were with us in the Kaokoveld. There was some talk of the imminent "Brandberg Expedition" (the Brandberg is a vast mountain mass in the southern Kaokoveld) and the organiser hoped we would join it, but our program ruled it right out. The Brandberg Expedition collected a species of *Lithops* on the summit, at an altitude of more than 6,000 ft. This was surprising and very interesting and I have one of the specimens now. It resembles *L. gracilidelineata* and will probably prove to be that Namib species. It might be of interest to state that the actual discoverer, a Mr. Rudner, of Cape Town, is an amateur archaeologist and had never seen a *Lithops* in his life. He told me that he was studying the stones beneath him when he saw what, at first, he took to be a "somewhat different stone" and there was the Brandberg *Lithops.* He also said that there were very few to be seen and that no specimen was seen with more than one "body", proving that

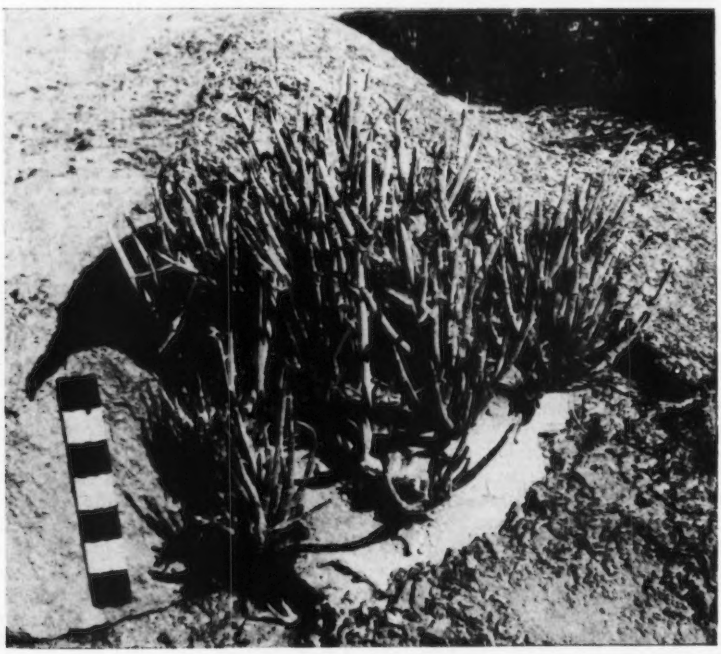


FIG. 102. *Adenia peschuelii* growing the the Kaokoveld, June, 1951. This species is found only in the Namib. Photo H. Hall.

FIG. 103. *Cissus krameriana* during its leafless stage in the winter season, growing in the Kaokoveld, South West Africa. Photo by H. Hall, 1951.

it must live to a great age without ever dividing into two leaf-pairs. The Brandberg, incidentally, is world famous for its primitive rock paintings.

We renewed our acquaintance with Mr. Wilhelm Triebner, known the world over for his knowledge of South West African flora. He generously placed one of his stout trucks at our disposal and arranged for his son, Siegfried, to be our guide. Johannes, Siegfried's Ovambo, completed the party and the latter revealed his astonishing memory, on several occasions, in guiding us without error, to waterholes, and through vast miles of pitiless sand-dunes. Siegfried, of course, had shared many of his father's journeys into the desert since childhood. We planned to spend about sixteen days exploring the principal regions where succulents occur. As these are often widely spaced, the reader will understand why we covered such vast distances in that limited time, almost three thousand miles, criss-crossing the Namib desert several times.

We began in real earnest the following morning, at 4 a.m., cold and dark, heading north for 200 miles to the north east of Windhoek. This first long run was to visit the only known locality for *Lithops elizabethae* at the foot of the Waterberg, a mountain mass sixty miles long. Here once more we saw the uncanny camouflage of *Lithops* in their habitat—pinkish brown plants amongst pebbles of the same colour, the latter sometimes rounded as though water-worn. Near here I saw one fine plant of *Tavaresia grandiflora* under an *Acacia* bush. Though this *Tavaresia* is a widespread plant this chanced to be the only specimen seen on the entire trip. Retracing our steps to Otjiwarongo we then headed south west through Kalkveld to Omaruru, admiring the magnificent flower spikes of *Aloe rubrolutea.* This scarlet flowered *Aloe* is widely distributed in the northern areas of S. W. Africa and extends to the Northern Transvaal. As we moved westerly the country becomes more and more arid and we couldn't fail to notice the weird, swollen brown stems of *Cissus krameriana,* at this, the winter stage, leafless. They reach enormous dimensions, as can be judged from the picture of the native boy standing in front of a specimen in the Kaokoveld, and weighing many hundred pounds. It was in the Kaokoveld where I noticed numbers of these giants which had evidently been pushed over by playful elephants, lying there for years before they would die and, where a single root still re-

FIG. 104. *Adenium boehmianum* growing at Swartbooisdrift near the Kunene River, Kaokoveld, South West Africa. Photo by H. Hall, June, 1951.

FIG. 105. "Lunar" landscape at Sendelings Drift, Orange River, South West Africa. Photo H. Hall, October, 1955.

mained in the soil, living on quite happily. We were now in a region of thorny trees of Commiphora, the curious succulent looking dwarf trees of *Moringa ovalifolia,* leafless now but with long, slender, "bean"-like fruits suspended from the young shoots. Reaching a small town called Karibib on the edge of the Namib Desert we spent the night and found conditions quite sultry, considering it was early winter.

Dominating the view at Karibib is the granite mass of the Erongo Mountains and amongst them, the next morning, we explored for *Lithops werneri,* the smallest of the genus. This tiny, yellow-flowered species was named after another of Herr Triebner's sons who chanced upon it when on a family picnic some years ago. Of course, a Triebner picnic must always have been a botanical one, and in this case so far from home. We saw it in extremely shallow layers of decomposed granite and humus about half an inch in depth. The four of us spent a long time on hands and knees in our search, so small, so difficult to differentiate between the mosaic of grit and the very few plants. Herr Triebner told us that after its discovery he spent some days tramping over the Erongos and never saw any other locality for it. How such incredibly small areas contain one species and nowhere else in the whole wild world always amazes me. Surrounded by towering monoliths of yellow-brown granite, this one shallow area below is but a few square yards, overlying the solid rock; a silent, lonely world indeed.

Since we planned to reach the coast at Swakopmund that day we reluctantly turned away from the Erongos, through Usakos, bathed in hot sunlight, the light intensified by the limestone formation which reflected considerable glare. Here the rainfall is probably less than 2 inches and the stunted sparse vegetation was ample proof. However, plentiful here was *Stapelia kwebensis* var. *longipedicellata,* under all the xerophytic shrublets, evidently a lime-loving *Stapelia.* It was a great thrill to see a few specimens of the yellow-flowered variety of *Aloe hereroensis.* The typical red-flowered plant extends from the Kunene River to the Northern Transvaal but this yellow flowered variety occurs only at Usakos.

As we headed towards the coast the vegeta-

tion virtually decreases to nil, particularly where the desert sand can be moved by winds. Purple with distance the scattered hills loomed on the skyline, jutting up from the vast and lonely desert. Seemingly able to cope with shifting sands is the bushy *Euphorbia gregaria,* a very widespread species. Some bushes may be ten yards across, though more commonly four to six feet. For several miles we passed colonies of the dwarf *Aloe asperifolia,* found only in the Namib. Like the more southern *Aloe claviflora* it remains low on the ground, growing outwards in ever increasing circles. It was possible to estimate that some of these circles, or portions, since they were never complete ones, would have a diameter of ten ft., and since it is very slow growing, must be of great age. Amongst the scattered quartz outcrops east of Swakopmund we found *Lithops ruschiorum,* a true Namib species, deep in the fissures of the rock firmly anchored against the desert winds. In colour greyish-yellow, like the rock, half-buried in fine sand. Some must become wholly buried but the vagaries of the wind will uncover them again in time. It was regrettable to see various outcrops of quartz being blasted by explosives for minerals or for some of the rose-tinted rock which is most attractive in colouring. This destroys the *Lithops* entirely since they cling only to such rock outcrops for their existence, utterly unable to survive in the looser sand of the desert floor.

From Swakopmund we headed north along the coast for ninety miles, passing huge salt pans and shallow lagoons without a trace of plant life, towards Cape Cross. This coast, known far and wide as the "Skeleton Coast" is one of the most inhospitable in the world. Waterless, fog-enshrouded for long spells, it skirts the entire length of South West Africa, and still takes its toll of coastal shipping from time to time. This long excursion northward was for the purpose of finding *Lithops nelii.* To get this we had to drive over soft, dry sand inland for several miles, never stopping unless on a rise of ground hard enough to avoid bogging down. The Namib is so dry the sand is always soft on the surface and can be most treacherous. The few specimens of *Lithops nelii* we saw were very old and more dead than alive, on sloping ground which was strewn with darkish shales populated with colourful lichens. In the blackish coloured rocks, in full sun, were plants of *Trichocaulon pedicellatum,* as dark coloured as the rocks, living for most of its life on the sea fogs, no doubt.

It might seem strange to travel ninety miles and back just to collect less than six specimens of *Lithops nelii* and a *Trichocaulon,* for there was nothing else to be had, but it was worth it to me, just to see one more species!

Having retraced our steps to Swakopmund the next item was to collect some study material of male and female flowers of *Welwitschia mirabilis* for Cape Town University. This botanical wonder is found only in the Namib Desert, though scattered from Swakopmund to Angola, where, I am informed, it occurs in thousands in the Portuguese territory. I had first met with this unique plant in the Kaokoveld scattered here and there both in flat, windswept desert and also on sides of low hills amongst grass. It occurs plentifully near the Swakop River, a large watercourse which flows about every ten years. Advised that large concentrations grew on the other side of the river we attempted to cross but got into difficulties in the heavy sand after fifteen yards and had to spend four precious hours in reversing those few yards to harder ground. The landscape in this vicinity is very wierd, dark and sombre, lifeless and plantless hills, for there is barely any rainfall.

Fortunately we had passed a few scattered specimens of the *Welwitschia* that morning and these sufficed for my purpose, luckily at the right time for the flowers. This curious desert gymnosperm bears a pair of dull green, leathery leaves which grow continuously from the base where they emerge from the woody rim of the dwarfed trunk. These leaf tips wear away as they are moved about by the winds, etc. The female "flowers" are greenish cone-like organs, 2 to 3 inches long, the males, on separate plants about half an inch long. This species is strictly protected by law. Apart from some dark green bushes of a species of *Zygophyllum* the desert was empty of life.

Due south from Swakopmund we progressed, past mountain high dunes of red sand, moulded by winds into amazingly beautiful shapes and curving, knife-edged ridges. About the only plant growing in the vicinity of these dunes was the thorny Cucurbit, *Acanthosicyos horridus,* known as the "Naras".

From Walvis Bay, some miles south of Swakopmund, we struck due south east, right across the Namib to Maltahohe. Gradually the lifeless sand changed to scattered tufts of the yellow silky grass, now dry and releasing its whitish seeds, as the ground became more stable. Twice we had to cross the Kuiseb, another dry river with wild, craggy landscape, where scattered specimens of the very poisonous *Euphorbia virosa* appeared to be the only plants around. About 50 miles from the coast some magnficent specimens of the tree aloe, *A. dichotoma,* stood like sentinels, their rich yellow flower spikes in startling contrast with the cloudless blue sky. In the valleys vegetation became more plentiful

FIG. 106. *Fenestraria aurantiaca* in habitat in the Alexander Bay Region. Photo by B. Brain.

and somewhere near Naukluft we saw fine specimens of *Hoodia gordonii* and *Stapelia schinzii* under the small shrubs. Flocks of wild ostriches were grazing but they are very timid and always move away at great speed. On this stretch I was delighted to see plants of *Cissus bainesii,* a very globular-stemmed succulent, a member of the Grape family, and a species I had long wanted to see in the wild. Near this we came across some huge specimens of another weird succulent, *Adenia (Echinothamnus) peschuelii.* The swollen stem measured about three ft. in diameter, with masses of pencil-thick shoots which bear small leaves and pale pink flowers. I had seen it before in the Kaokoveld, smaller specimens it is true, but everywhere they grew from fissures of immovable rocks. Near Helmeringhausen we collected a nice looking *Lithops* which resembles *L. rugosa* but it has not yet been determined.

From here our plan was to proceed due south to Aus, make our headquarters there for a few days before returning to Windhoek. Aus is a small town on the edge of the Namib, about 4,000 ft. above sea level and experiences chilly weather in winter. Snow has been known to fall there. On the plains around the town we saw numerous specimens of *Euphorbia namibensis,* globular above ground and with enormous deep, parsnip-like roots. As with other species of its kind, its copious latex, which gushes forth when roots are broken, emits a most unpleasant stench. Here we met a friend of the Triebners (they had friends all over S. W. Africa) who told me that *Lithops bella* grew on his land. How we searched that afternoon! I firmly believing that the sheep and goats had destroyed them all until I found one plant in decomposing granite, once more exactly matching the grit in its colouring. As afternoon advanced the ground where we had been so carefully examining became studded with the snow-white flowers of hundreds of plants, revealing their presence so flagrantly, but barely any portion of the leaves was above the grit. I will add here that in cultivation all *Lithops* elevate somewhat and this is a more safe condition since most people are too generous with the water can. Another advantage is that the full beauty of the plant can be seen whereas in nature they are almost wholly hidden, sinking down from the sun and wind. Only in one small white quartz hillock, no bigger than a small dwelling house, did I see a very interesting *Crassula* which Mr. P. C. Hutchison informs me is his *Crassula ausiensis.* It grew in the minutest of fissures where only a screwdriver could extricate portions of the plant. Here grew *Cotyledon orbiculata,* a very widespread and ex-

FIG. 107. *Pachypodium namaquanum* under a cloudy sky near the Orange River, South West Africa. Photo by H. Hall.

tremely variable species. Some very dried-up specimens of *Aloe variegata* (once known as *A. ausana*) existed under bushes but this species is always nibbled by stock whenever they can get their muzzles to it.

About eighty miles due west of Aus is the coastal town of Luderitz, home of *Lithops optica*. For years I have dreamed of seeing the red variety *(L. optica* var. *rubra)* in the wild state. All *Lithops* enthusiasts will readily understand. It is, of course, well known but still extremely rare in collections. Besides, Siegfried said that before reaching Luderitz we would pass by a locality for *Lithops franciscii* so we had a very interesting day before us. A few miles out of Aus a prominent notice board, inscribed in three languages, informed us that we were entering the diamond area. This meant that no one is allowed to wander beyond a very limited distance from the road! Once more we could observe the gradual decrease of the, at all times, scanty vegetation in our progress westwards. Distant hills on either side appeared more tempting because they were out of bounds now. At Hahlenberg, merely a name on the map and a stopping place for trains, with one tiny hut and a water tank, we made a very hurried scramble up the slope where we found *L. franciscii,* very dried up, in broken granite and fissures of very hard rock. Like all these hills in the Namib, these hills were oases for an amazing group of succulents which cannot be found on the desert floor below. Thus I could note several Conophytums, one of which is *C. halenbergense,* Crassulas, Cotyledons, *Euphorbia dregeana, Stapelia juttae* and many other plants. Here I saw *Juttadinteria simpsonii* for the first time in the wild.

The environs of Luderitz appeared, grey-white dunes, dull-coloured, salt-loving plant

FIG. 108. *Pachypodium namaquanum* growing at Numees near the Orange River, South West Africa. Photo by B. Brain, September, 1955.

forms such as *Zygophyllum* spp., and here and there the brilliant red of an occasional flower of *Pelargonium fulgidum*. Fortunately the area where *Lithops optica* occurs is not out of bounds and it is a huge area of undulating, whitish ground, broken by outcrops of darker rock. When I first saw *Lithops optica* I was scooping the very soft grey sand from another plant altogether, none other than *Euphorbia verruculosa*, a species which is rarely seen in cultivation and one which I had not seen beyond the pages of "The Succulent Euphorbieae." The *Lithops* were almost wholly buried in soft sand; some indeed became exposed that were evidently quite covered. And whilst scraping more ground on the same spot I saw a minute pair of reddish "eyes", about one quarter of an inch in size, peeping up at me! My very first *"rubra"*. A great thrill. I saw one more specimen and no more but that there *are* many more goes without saying if their extremely well hidden situation is anything to judge by. Quite a number of dwarf succulents occur here, Crassulas, *Cotyledon schaeferi*, *Dracophilus* and *Juttadinteria*, dull-coloured clumps of the tiny *Conophytum saxetanum* clinging to cavities in the small rock outcrops, etc. We made a brief call on Herr Eberlanz, a white-haired, gentle-voiced old German who has collected many plants of the Namib in his time. The genus *Eberlanzia*, *Lithops eberlanzii* and others bear his name. He keeps an interesting collection in his small garden surrounded by high walls which, in some measure, keep out the eternal sea winds. On our arrival back in Aus that evening we celebrated the little red *Lithops*. As it happened to be my birthday we had an excuse for a double celebration!

The next item on our program was to head due south from Aus towards the Orange River, having left all our spare gear behind. Quite near the town we noticed some gorgeous *Aloe* in flower and this proved to be the South West African form of *A. microstigma*, formerly known as *A. juttae*. When we were in the neighbourhood of Pockenbank (there never is anything to indicate when one is actually at places in these remote regions) we explored a curious-looking band of quartz, traceable over several hills, and only in this narrow stratum did we find *Lithops marthae*, one of two bearing belated yellow flowers. At a place called Witputs, merely a police outpost, a low, white hillock invited exploration, about half a mile from the road. It was well worth the bumpy ride over the veld for there we saw large numbers of *Lithops erniana*, pinkish grey, very wrinkled with drought, and very exciting to see. We had met Herr Erni, son of the man after whom this *Lithops* was named, in the post office in Aus. Of course, young Triebner knew him and introductions were passed around. Herr Erni had called for his mail and he was actually holding a copy of an English Cactus and Succulent Journal in his hand. The conversation veered to succulents, of course, and mostly in German which I could not follow, but eventually Erni, perhaps somewhat puzzled, asked my name again, said "Is it the same as the writer in this magazine?", tapping his mail, and seemed quite surprised to see us in such an out of the way spot.

FIG. 109. *Aloe rubrolutea* growing in the Kaokoveld. Excluding the inflorescence the plant is about 6 ft. tall. Photo H. Hall, June, 1951.

Witputs is about ninety miles south of Aus but we still continued many miles more until the more mountainous region began to take on a similar appearance to the Richtersveld which is on the south of the Orange River. For about 25 miles before reaching the river we passed slopes of hills clothed with the splendid *Pachypodium namaquanum*. My photograph of one of them showing the curious curvature of the apex is quite characteristic. Another depicts the flowers, taken by my young friend Bob Brain of the Transvaal Museum when we were in the Richtersveld on a later occasion. These slow

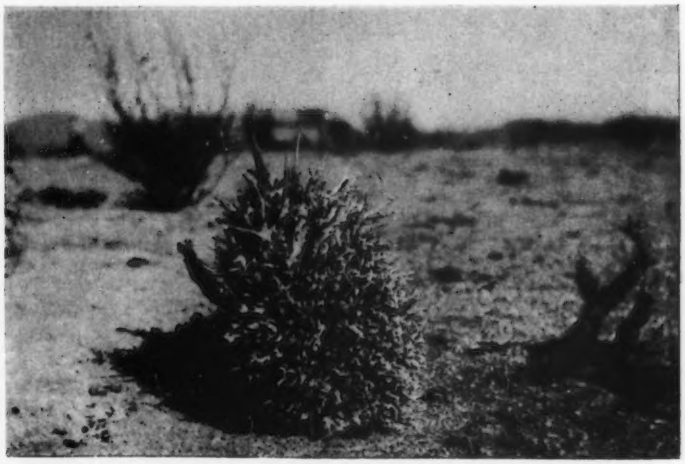


FIG. 110. *Euphorbia friedrichiae,* southern South West Africa. The resinous skeleton of *Sarcocaulon rigidum* alongside is typical of the desert scene. Photo H. Hall, 1952.

growing, thorny succulents occur only in the Orange River region, on both sides, but only where the rainfall is very low. Great colonies of *Aloe pearsonii* grew amongst them, leaves almost scarlet with drought, scattered plants of *Aloe dichotoma* and the whole flora very reminiscent of that of the Richtersveld.

In one sandy valley grew Aloes of such noble proportions that we investigated and found that they were unmistakably *A. pillansii,* their old flower spikes still attached, semi-decumbent and widely branching, unlike the erect, three-pronged spikes of *A. dichotoma.* Furthermore, *A. pillansii* flowers in September and both its relatives, *A. dichotoma* and *A. ramosissima,* growing around in the surrounding hills were then in full flower (May). Dull-scarlet with drought, *Aloe gariepensis* occurred here, huge bushes of *Pelargonium spinosum* with white flowers, the rare *Crassula sladenii,* Conophytums, Cotyledons and all manner of species I was familiar with on the opposite side of the river. We made camp at the foot of one of the hills with the Pachypodiums standing stark and eerie on the skyline in the darkening sky.

From here, our most southerly point, we started our long journey north to Windhoek. Lovely herds of Springbuck grazed peacefully in the yellow grass of the plains south of Aus, flocks of Ostriches and small groups of Zebra which are surely one of the most handsome of wild animals. One or two stumpy looking Euphorbias were *E. friedrichiae,* a species difficult to cultivate. From Aus we went to Karasburg with a brief stop near Kuibis where we found *Lithops kuibisensis,* a darkish red species growing in dark coloured rock mixed with limestone. A short run south again towards Warmbad for *Lithops julii* and the curious *Lapidaria margaretae*—like wrinkled bits of reddish stone—before another short deviation to the east side of the Great Karas Mountains to seek for *Lithops lydiae.* This was really difficult and though Siegfried knew exactly where to search they were few and, so incredibly like the speckled, dull, bluish brown stones as to be almost unbelievably hidden. I collected some of the surrounding stones so that in captivity I can repeatedly admire this mysterious similarity. *How* these plants mimic their surroundings so perfectly I cannot understand.

When some miles south of Windhoek once more we collected *Lithops alpina* (it is included in *L. pseudotruncatella* now) and again I must emphasize the fantastic similarity to its surroundings. It was a light brownish colour and the surrounding pebbles, amongst *Acacia* bushes, were the same colour exactly. A tiny *Anacampseros avasmontana* grew near by. The altitude here was about 6,000 ft.

Our time was nearly up but we had one more day, this time with Wilhelm Triebner himself to share the journey to seek for *L. edithae,* a pretty, pale coloured species also regarded as a form of *L. pseudotruncatella* by Nel. This occurs many miles to the east of Windhoek in a very small area of white quartz.

Here, after nearly three weeks, my story of Lithops collecting must end. We hurried back to the Cape in three strenuous days, driving almost continuously. The last three hundred miles were through heavy rain just to remind us that it was still winter in South Africa and that the western Cape is a winter rainfall area.

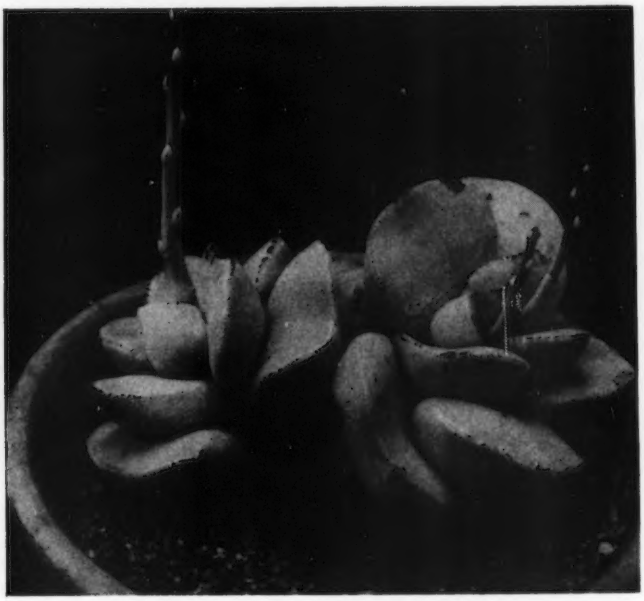


FIG. 111. *Adromischus hallii* Hutchis., the clonotype, U.C.B.G. No. 53.1115-2.

ICONES PLANTARUM SUCCULENTARUM

1. *Adromischus hallii* P. C. Hutchison*

By P. C. HUTCHISON

In 1953 the University of California Botanical Garden (Berkeley) received its first shipment of Crassulaceous plants from Mr. Harry Hall of the National Botanic Garden, Kirstenbosch, South Africa. In this shipment and in succeeding ones were several new taxa in *Adromischus* and of these the species described below was Mr. Hall's favorite. At the time it was forwarded to us in December, 1953, Mr. Hall wrote of it: "Another very interesting [*Adromischus*] was number 75/53 which I collected a few hundred yards from the sea near Alexander Bay where the rainfall is practically nil though sea fogs are prevalent. It is somewhat mealy leaved and very dwarf. I now recall that this species is among the herbarium sheets for it was in flower and I felt that it might well be unknown from that spot which is behind the wire fence which protects the precious diamondiferous gravel——. We got special permission to cross to the striking and singular mountains on the coast there. The plants grew around the base of the hill where the loose, fine Namib sand formed the plains and where a few loose rocks gave them a modicum of anchorage——. It was among some I sent Herre [H. Herre, Stellenbosch Botanic Garden, South Africa] for you but he may well be getting them established too. I do not want it to lose its powdery appearance though, as it assuredly will under too much glasshouse treatment." Later Hall added that the locality was called "Buchu Twins, about ten miles south of Alexander Bay." At the National Botanic Garden, Kirstenbosch, this species was grown as number 75/53, but it has since died there. Under cultivation here, under glass, it has retained its white coloring.

Adromischus hallii P. C. Hutchison, *sp. nov. Planta nana; caules 1-2 cm. longi; folia arcte rosulata sessilia asymmetrice rotunda usque ad 2.5 (3.5) cm. longa*

*University of California Botanical Garden Contribution Number 137.

lataque et usque ad 13 mm. crassa alba, margine apicali bullato incrassato concolori vel obscure fusco-rubro, omnibus sectionibus transversalibus saepe asymmetricis; flores 10-15 erecti solitarii; pedicelli usque ad 10 mm. longi; perianthii tubus glauco-viridis 14 mm. longus, superficie interiore laete viridi quadrante superiore papillosa, lobi patentes vel recurvati 2 mm. lati 3 mm. longi albidi et roseo-tincti marginibus fusco-rubri basi papillosi.

Roots tuberous. *Stem* erect, 1 to 2 cm. long, up to 1 cm. diam., gray, wrinkled. *Leaves* subopposite, forming a tight rosette, horizontal to erect, sessile, mostly asymmetrically rotund, usually as long as broad, up to 2.5 (3.5) cm. broad and long, up to 13 mm. thick, convex on lower face, concave or convex on upper face and also irregularly and shallowly channeled, gray-white, unspotted, the apical margin thickened, bullate, sometimes crisped on young leaves, concolorous to glaucous maroon, the cross-sections at any point of mature leaves usually asymmetrical. *Inflorescence* simple; peduncle *ca.* 20 cm. long, up to 4 mm. diam., gray-white, lower 7 to 9 cm. with 4 to 9 thick, blunt, ovate-deltoid to deltoid sterile bracts 1.5 mm. broad, up to 4 mm. long and up to 1.5 mm. thick; rachis 10 to 12 cm. long; flowers 10 to 15, erect, single. *Pedicels* gray-white, up to 10 mm. long, 2 mm. diam. at base and middle, 3.5 mm. diam. at apex. *Calyx* lobes deltoid, acute, sometimes purplish tipped, *ca.* 2 mm. wide and long. *Perianth* tube glaucous-green outside, bright green inside, 14 mm. long, 4 mm. diam. at base, narrowed to 3 mm. at middle and above, the cross-section at mid-point strongly pentagonal with rounded corners and indented at the sinuses, the sinuses extending as conspicuous indentations of the tube to *ca.* 7 mm. from the apex, inconspicuous below there, the tube throat con-

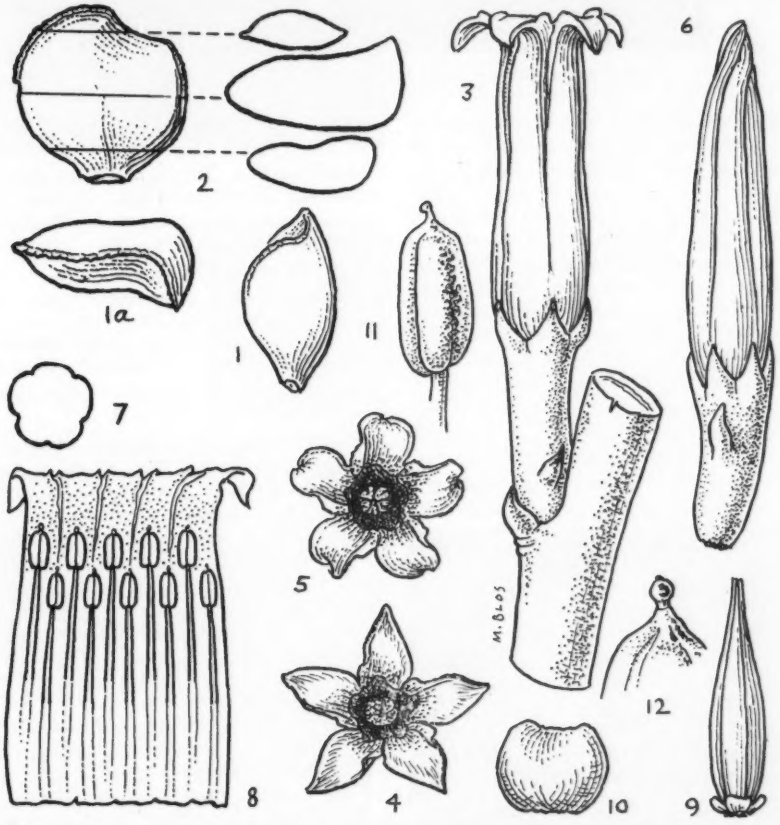


FIG. 112. *Adromischus hallii* P. C. Hutchison. 1. Leaf, side view. 1a. Leaf, apical view. 2. Leaf, top view and cross-sections. 3. Flower. 4. Perianth limb, expanded. 5. Perianth limb, recurved. 6. Bud. 7. Cross-section perianth tube at midpoint. 8. Stamen insertion. 9. Carpels. 10. Nectary scale. 11. Anther. 12. Anther apex. 1-2 natural size. 3-9, x 3. 10-11, x 9. Dots on 4, 5 and 8 indicate papillae; on 11-12, red spots. Drawing by Mrs. M. Blos.

FIG. 113. *Adromischus hallii* Hutchis., U.C.B.G. No. 53.1115-1.

spicuously and densely papillose, the papillae yellow, translucent; limb lobes spreading or recurved, oblong-ovate, somewhat acute, 2 mm. broad, 3 mm. long, pale whitish, tinged faintly with lavender or rose, with dark purplish maroon margins, bases papillose, the lower papillae yellow, the upper colorless. *Stamen* filaments didymous at about the middle of the tube, 3 to 4 mm. long, green or yellow-green; anthers included, oblong, creamy yellow with many red spots in longitudinally arranged masses along the grooves and also at the apex below the terminal translucent globule. *Carpels ca.* 11 mm. long, green, the styles subulate, pale yellowish green, the stigmas unenlarged, included. *Nectary scales* 1 mm. long, 1.5 mm. broad, the apex shallowly concave, the sides convex, with rounded corners, white or greenish white.

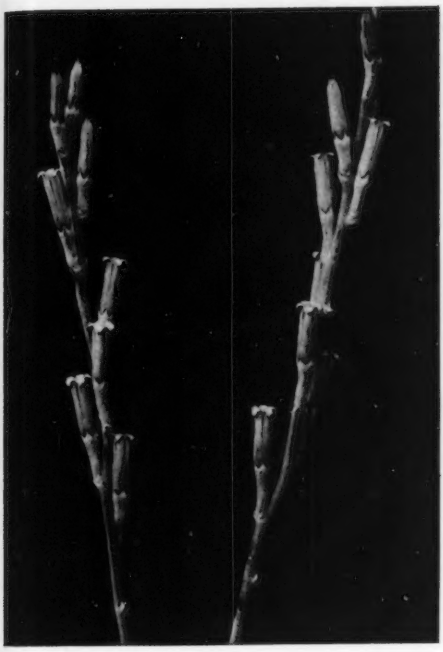
FIG. 114. *Adromischus hallii* Hutchis.
U.C.B.G. No. 53.1115-3

South Africa: Namaqualand, at the base of the Buchu Twins *ca.* 10 miles south of Alexander Bay, originally collected by H. Hall, *University of California Botanical Garden number 53.1115-2* (BOL-Holotype).

Three plants of this new species were received from Mr. Hall and survive in cultivation here. Clone -2 was chosen as the clonotype and from it the drawing and the holotype were prepared. There is no significant vegetative variation between the three clones.

Adromischus hallii belongs with a group of Namaqualand species that includes *A. herrei* (Barker) Poellnitz, *A. marianae* (Marloth) Berger, *A. kubusensis* Uitewaal, *A. antidorcatus* Poellnitz and *A. rodinii* Hutchison. It differs from all these species by its sessile asymmetrical white leaves. This group of species appears to be sufficiently natural to be considered a section. However there are some additional taxa to be described which belong here and until they are studied further the sectional diagnosis will be delayed.

The specific name honors the collector, Mr. Harry Hall of the National Botanic Garden, Kirstenbosch, Newlands, C. P., Union of South Africa, whose many collections of African succulents, particularly from the Cape and from Namaqualand, are especially noteworthy for the number of rare and new species and his fine habitat notes. Mr. Hall responded to my request for a brief biographical statement with the fol-



lowing: "I underwent the usual horticultural training: Reading, John Innes Horticultural Institute, Kew, and a year at La Mortola. I have been interested in succulents since 1932 and from 1933 to 1947 was in charge of the Darrah collection of cacti and succulents in Manchester, England, apart from the war years when I was in the R. A. F. Since coming here [Kirstenbosch] in 1947 I have devoted all my spare time, apart from various "official" expeditions, to plant collecting, largely succulents."

Mr. Hall has published a number of descriptive accounts of his travels in South Africa in the British cactus journals and recently he wrote an excellent small handbook on some African succulents ("Common Succulents" by H. Hall, Longmans, Green & Co., Cape Town, 1953, *xv* + 32 pp., 4 color plates showing 16 species). Several years ago a *Euphorbia* which he collected was named in his honor *(Euphorbia hallii* R. A. Dyer, Journ. So. Afr. Bot. *19 (4):* 135-136, pl. 19, 1953).

FIG. 115. *Adromischus hallii* Hutchis., the clonotype, U.C.B.G. No. 53.1115-2 inflorescence. x 0.7

QUESTIONS and ANSWERS

Conducted by
HARRY JOHNSON
Paramount, Calif.

Question: My *Bryophyllum daigremontianum* grew until it reached the ceiling and then kept growing along the ceiling until it was almost seven feet tall. Finally I took a hatchet and chopped it down. The trunk was almost three inches thick. Is this plant some sort of tree, and if so how large would it have grown if left untouched? Will my *B. tubiflorum* grow to the same size?

MISS SHIRLEY SEHRADE, Ohio

Answer: The Bryophyllums generally do not exceed 4 feet but if grown without direct sunlight may become much taller. *B. daigremontianum* should flower at about 30 inches if in sun. *B. tubiflorum* bears handsome tubular red bells in clusters about Christmas-time. It will flower when about 15 to 24 inches in height. These lush growing succulents need direct sunlight to flower well and to keep them from reaching for the stars. However their great interest is the production of tiny plantlets on the margins of the leaves and they will do this even in the shade. *B. crenatum* has been sold in the past as an airplant—the leaves being shipped with instructions to pin them on the curtain where they will produce the little plants at the crenations.

Question: I received from you a plant labelled *Neohenricia sibbettii* which appears to be a Mesemb. Can you tell me something about it?

MRS. MARY L. CONWAY, W. Va.

Answer: This very interesting small succulent was published in 1938 by Mrs. L. Bolus in the South African Journal of Botany. A tiny creeping plant forming small mats as it roots at the nodes. The leaves are pebbled as in the Jewel Plant, *Titanopsis calcareum.* The small flowers are not bright. For those who enjoy the odd, dainty and small, it is very much worth while. It grows quite easily in sand with a little leafmold added or in an open compost. It presents no particular cultural problems if given about the same care as *Titanopsis* or *Lithops.* Botanically it is not too far from *Delosperma* and *Titanopsis.*

Please send your questions to Harry Johnson, Johnson Cactus Gardens, Paramount, California.

"Berkeley in '57"

THE SEVENTH BIENNIAL CONVENTION OF THE CACTUS AND SUCCULENT SOCIETY OF AMERICA, INC.

Berkeley, California, July 12-16, 1957

Newsletter No. 1—August, 1956

This illustrated newsletter will appear in each Journal between now and convention time to furnish you with details of the instructive and entertaining sessions being planned for you, as well as to present information about the local collections and scenic wonders with which central California abounds. We hope this will be useful to those already planning to attend and influential in convincing others that they can hardly afford *not* to attend. Reprints of these newsletters will be given to all registrees at the beginning of the Convention so they can be referred to when most needed.

PLACE AND DATE

Hotel Shattuck, Berkeley, California,
July 12-16, 1957.

REGISTRATION AND RESERVATION

Convention registration fee for both adults and children will be $1.50, and those who are not members of the Society may also attend by paying this fee. Early in 1957 forms will be mailed to all Journal subscribers for registration as well as for reservation for rooms and meals at the Hotel Shattuck. This hotel is well-equipped for conventions due to the many that are held in this university town. A large banquet hall will be the location for our meetings. The hotel itself is centrally located in Berkeley and is adjacent to public transport to Oakland and San Francisco. As some persons may wish to stay in a motel we will list suitable ones in a later column—however, as there are none near our meeting place which are large enough to hold all those attending, we have chosen this hotel as headquarters.

FIELD TRIPS AND TOURS

Popular features of past convention programs have been the field trips for the purpose of viewing native cacti. There are a few interesting species of *Dudleya* and *Sedum* native to central California but it is unlikely that a sufficient number of interested persons would wish to go on a special trip to see them. In any case one may see all these species growing in local collections, while instructions for finding them in the field will be furnished to those interested.

So instead of field trips, scenic tours and visits to private and public gardens will be featured in our next convention. Our main scenic tour will be by chartered bus and has been planned to include as many of the local sights as can be comfortably seen in half a day. Starting from our hotel on the afternoon of July 15 the main points of interest will be:

Richmond-San Rafael Bridge. From this newly-completed bridge crossing northern San Francisco Bay there is a fine view of nearby islands and mountains, as well as a long-distance glimpse of San Francisco and its Bay Bridge.

Golden Gate Bridge. On our way to San Francisco we will cross over the world's largest single-span suspension bridge, noted also for its beautiful design and situation.

Cliff House. From this historic restaurant and tourist shopping center perched on the westernmost cliffs of San Francisco one has an excellent view of the Pacific, the beach, and Seal Rocks.

Golden Gate Park. Our bus will take us slowly through this famous park with its 1000 acres of beautifully landscaped plantings. We will pass by such features as the Aquarium, the Conservatory, Museum, Arboretum, and Rhododendron Dell. Though we will not have time to visit these places those interested may return for this purpose later.

Chinatown. After passing by San Francisco's civic center and opera house we shall proceed along Market Street and through a section of the largest Chinatown outside of the Orient. The famous cablecars will be seen during this part of the tour.

Fisherman's Wharf. One of the features of the Bay Area most visited by tourists is this picturesque spot where the fishing fleet docks and fine restaurants serve a great variety of sea food. Nearby one may see the great dock area of this city with its liners and warships from all over the world.

San Francisco-Oakland Bay Bridge. On the return to our hotel we will pass over this eight-mile long bridge with its beautiful views of San Francisco, Treasure Island and the East Bay cities of Berkeley and Oakland.

Many will wish to return for a more thorough exploration of some of these places, but this tour is intended to show them what is to be seen and will suffice for many of those attending the Convention. For those intending to visit the more remote tourist attractions, such as the National Parks of Yosemite, Kings Canyon, Sequoia and Crater Lake, road maps with suggested routes will be available. The Bay Area is noted for its many excellent restaurants and places of entertainment and you are urged to attend a few during your stay here—further information and recommendations can be obtained at the Convention. Because the Convention itself is tightly programmed it would be worthwhile for you to arrive here early or stay afterwards in order to appreciate some of the non-succulent aspects of this area.

FIG. 116. *Parodia comarapana* Cárdenas.
Photo by P. C. Hutchison.

CONVENTION PROGRAM

A detailed program will be printed in the Journal just before the Convention, but it will be of interest to give here a brief resumé of the program highlights.

Thurs.,	July 11:	p.m.	Registration and assignment to lodging
Fri.,	July 12:	a.m.	Ceremonies
		p.m.	Lectures
		eve.	Coronation, lectures
Sat.,	July 13:	a.m.	Individual visits to private collections
		p.m.	Lectures
Sun.,	July 13:	a.m.	Delegate meeting
		p.m.	Auction, lectures
Mon.,	July 15:	a.m.	Tour of UC Botanical Garden
		p.m.	Group tour of Bay Area
Tues.,	July 16:		Individual visits to collections
		eve.	Banquet and closing program
Wed.,	July 17:	a.m.	Meeting of members of the International Organization for Succulent Plant Study
		p.m.	Lectures by I.O.S. members (open to public)

HORTICULTURAL SYMPOSIUM

A new innovation, one which we hope will be repeated in future conventions, will be an entire evening's symposium in which the horticultural side of our hobby will be thoroughly discussed. A group of experienced growers and specialists will convene on stage and a moderator will bring up each subject for them to discuss so that their differing beliefs and methods can be compared. After each subject has been treated the audience will be expected to ask questions and contribute their own views. Audience participation will be stressed in this program, for all of us have trouble growing certain plants or need help with some other problem—on the other hand many have discovered facts or methods which should be shared with others. So while we hope you leave your personal cares at home, we do encourage you to bring along your horticultural problems. It is hoped that demonstrations can also be given during this program, including those on seed sowing and grafting.

FUN SESSIONS

Several short but enjoyable fun sessions will be presented and each will be presided over by an expert in this field. The traditional cactus-theme fashion-show will be a feature of one of these sessions. More details will be presented in a later bulletin.

PLANT AND BOOK AUCTION

One of the pleasant memories of the last convention was the spontaneous auction of a book by Howard Gates, the proceeds going to the Convention Fund. We think this is a custom worth maintaining and plan a more elaborate one for 1957. This time everything auctionable connected with our hobby will be featured: plants, books, seeds, catalogs, gadgets, pictures. The entire net proceeds will be donated to the Convention Fund of our national society, and it is hoped that this procedure will be followed in the future. The articles to be auctioned for this good cause may be donated by affiliates, members of affiliates, unaffiliated members and commercial nurseries, and voluntary contributions are now solicited; already a considerable number of plants have been given by the host affiliate, the Cactus and Succulent Society of California. All persons who have something to donate in the above categories should write the undersigned in the near future, sending a list in which the items are named and described. Here is an opportunity to dispose of that extra cactus book, catalog or plant. Anything is likely to be acceptable, but naturally the rarer and more desirable it is the higher price it will bring and the more it will benefit future conventions through the Fund—also the

FIG. 117. *Neoporteria atrispinosa* Backeberg. Photo by P. C. Hutchison, about 4/5 natural size.

more spirited the bidding the more entertaining the auction will be.

GIFTS AND PRIZES

During each convention session there will be a drawing for one or more valuable door prizes, consisting of large specimen plants or rare species. At the opening and closing sessions the plants selected will be particularly choice. Also at the opening of the first meeting (July 12) each registered attendee will find at his place at the table a wrapped plant donated by the host society; most of the species selected have been introduced to this country only within the last three years, are unusually interesting or attractive, and are largely unavailable as yet through commercial sources.

Some of these plants, as well as certain ones selected for the auction and drawings, will be illustrated in this column.

PHOTOGRAPHS

An official convention photographer will be provided, and prints of the events, persons and ceremonies will be available at standard fees direct from the photographer, both during and after the Convention.

CONVENTION OFFICERS

Following is a list of our convention officers for the convenience of those wishing to contact them.

Chairman: Paul Hutchison,
3017 Wheeler St., Berkeley 5, Calif.
1st Vice-chairman: H. M. Butterfield,
1140 Sutter, Berkeley 7, Calif.
2nd Vice-chairman: Pat Moorten,
P. O. Box 851, Palm Springs, Calif.
3rd Vice-chairman: Lad Cutak,
Missouri Botanical Garden, St. Louis, Mo.
Treasurer: R. Hillery,
243 Athol Ave., Oakland, Calif.
Secretary and Publicity Chairman: Myron Kimnach,
5918 Jordan Ave., El Cerrito 9, Calif.

VISITS TO COLLECTIONS

As previously mentioned, during this convention the emphasis will be on visits to collections. There are a number of exceptionally fine ones in central California, both private and public. Of the latter, the Botanical Garden of the University of California at Berkeley has already received considerable publicity in this Journal (July-August, 1953, and July-August, 1955) and for this reason we shall have little to say about it in future newsletters, except to point out that conventioneers will pay it a group-visit for a half-day on July 15.

Another public collection offering a succulent display is in Golden Gate Park at the Strybing Arboretum and Botanical Garden, whose Supervisor is the well-known *Echeveria* authority Eric Walther. Here a successful attempt has been made to use succulents other than cacti in landscaping. Most of this work has been done in and near the rock garden, but many Puyas, Aloes, etc., can be found in beds elsewhere in the Arboretum. The bus taking us through the Park will not have time to stop here, but all are urged to return at some time for an extended visit. Those with a wider interest in plants should also see the nearby Conservatory with its colorful displays of tropical plants.

In each issue one of our outstanding private collections will be described so that the visitor may decide which he most wants to see. In a forthcoming issue a complete list of members of the local society, their addresses, phone numbers, specialty and size of collection will be given, and in the following issue will be a similar list of non-members who have interesting collections. At the Convention, information as to visiting hours and routes can be obtained.

FIG. 118. *Haworthia ubomboensis* Verdoorn.
Photo by P. C. Hutchison.

The first example of our better collections is that of Al Irving, 2163 Alameda Ave., Alameda, Calif. Mr. Irving's specialty is succulents other than cacti, in particular those of South Africa. He has been importing plants or growing them from imported seed for many years and undoubtedly has the largest private general collection of African succulents in the United States. As a rule these plants are much more demanding in such matters as growing periods, sensitivity to overwatering, soils, etc., than are cacti or other succulents from the Americas, and to grow them successfully requires a good knowledge of their requirements—in this Mr. Irving is deservedly considered an expert. Some 60 species of *Lithops*, all grown by him from seed, are among his favorite plants. Among his other Mesembs are over a hundred species of *Conophytum*, and many Argyrodermas, Ophthalmophyllums, Gibbaeums, etc. Among his 200 or so varieties of *Haworthia* are many which can be seen nowhere else in this country; he is unusually skillful in propagating this genus from leaves. Many stapeliads, Euphorbias, Ceropegias and over 100 kinds of *Adromischus* can be seen, as well as little known species of *Pachypodium, Alluaudia, Cissus, Xerosicyos*, etc. A number of the finer Echeverias, Sedums, and Graptopetalums are among those American succulents present. Mr. Irving will be glad to see interested visitors and, though a very modest gentleman, can be persuaded to give advice to those who have trouble growing these plants. For another comment on this collection see page 113 of the Journal for July-August, 1955.

INFORMATION

Though much additional information will be printed in this column in the months to come, those who wish to make inquiries at this time may write the undersigned.

MYRON KIMNACH
Convention Committee Secretary
and Publicity Chairman
5918 Jordan Avenue
El Cerrito 9, California

FIG. 119. Photos in this and following Newsletters will show the kind of plants you will see in central California collections. Here are two colorful examples: at top is a clump of the bluish-white *Echeveria elegans* from Mexico, while in flower below is a South African species of *Cheiridopsis*, one of the more easily grown stemless Mesembs. Many eastern members will be surprised when they see how usually drab species color up from year-round cultivation under the California sun. As summer progresses the colors deepen, as shown in this photo.

FIG. 120. *Werckleocereus imitans* Kimnach & Hutchis. Flowering stem about natural size. Photographed at midnight.

ICONES PLANTARUM SUCCULENTARUM

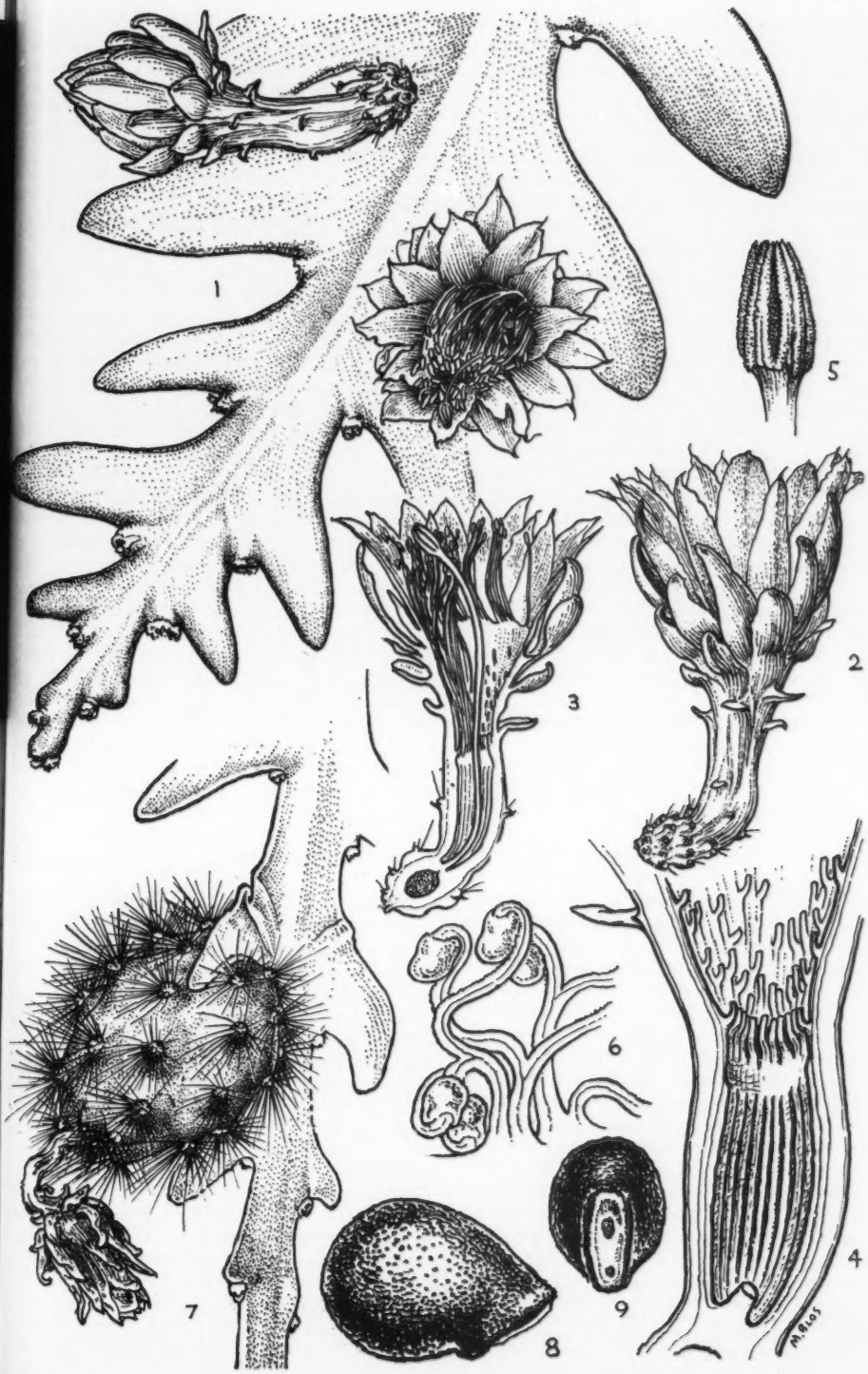
2. *Werckleocereus imitans* Kimnach and Hutchison*

By MYRON KIMNACH AND P. C. HUTCHISON

In 1952 the University of California Botanical Garden (Berkeley) received a valuable shipment of epiphytic cacti from Costa Rica. Conspicuous among cuttings of undetermined Epiphyllums was a stem with deeply incised, angular lobes so similar to those of *E. anguliger* (Lem.) Don that we assumed the plant to represent, at most, an interesting extension in range of that Mexican species. However, in March, 1954, it produced several flowers with a short receptacle and a spiny pericarpel, characters quite untypical of *Epiphyllum*. While these flowers were considerably less attractive than those of *Epiphyllum anguliger*, they proved far more interesting botanically. A study of the literature soon showed the plant to be a new species closely allied to the Britton and Rose genera *Werckleocereus*, *Eccremocactus* and *Weberocereus*. Its history and description are presented here in

*University of California Botanical Garden (Berkeley) Contribution No. 138.

FIG. 121. *Werckleocereus imitans* Kimn. & Hutchis. 1. Stem, bud and apical view of flower. 2. Flower, side view. 3. Flower, longitudinal section with stamens cut-off on the right side to show insertion. 4. Nectary chamber and insertion of lower stamens. 5. Stigma-lobes. 6. Funiculi and ovules. 7. Fruit. 8, 9. Seed. 1, 2, 3, 7, natural size. 4, x 3. 5, x 4. 8-9, x 20. Drawing by Mrs. M. Blos.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detail as it seems to be a species critical to an interpretation of the phylogeny of those genera as well as of the subtribes *Epiphyllanae* and *Hylocereanae*.

Together with a number of other epiphytic cacti, this species was sent to us by C. H. Lankester, of Cartago, Costa Rica. Though born in England, Mr. Lankester has resided in Costa Rica since about 1900. Besides managing his coffee *finca* "Las Concavas," he has long indulged a great interest in the natural history of his adopted country and has collected many specimens for botanists and zoologists. On his estate he has gradually built up a famous collection of tropical plants, native and introduced, including what is reputed to be the world's largest private collection of species orchids. Aroids, bromeliads, gesneriads, and ferns are also among his special interests. All have been established about his garden in a naturalistic manner, most of the orchids being affixed to trees. Mr. Lankester has always been fond of succulents and on his trips about the country has collected nearly all the native cacti and grown them in his garden. In the shipment received by us were a number of new or little-known species including *Pseudorhipsalis himantoclada* (Goss.) Britt. & Rose, *Epiphyllum grandilobum* (Web.) Britt. & Rose, *Hylocereus calcaratus* (Web.) Britt. & Rose and three species of *Weberocereus*.

About 1940 Mr. Lankester was collecting in the El General Valley, situated on the western face of the Talamanca Range, in southwestern Costa Rica. Near a site called Cañas (not to be confused with the better-known town of that name near Guanacaste, Costa Rica), he found the new *Werckleocereus* growing epiphytically in rather scrubby forest; apparently it was not common. Plants established on a tree stump in his garden have thrived in the years since. The manner of growth, according to him, is "straggling and, like so many of our scandent cacti, limited merely by the style of its surroundings—the branches grow about 18 to 24 inches and then send out side growths, and so progress." He also writes that at his estate "It is much subject to the attack of the microlepidopterous larval borer that so disfigures and destroys our cacti here." A few years ago this species was distributed by him to several European collections and in 1949 he sent it and other Costa Rican cacti to southern California. Most of the species in the latter shipment, including this *Werckleocereus*, were soon killed by the freeze of that year.

Werckleocereus imitans Kimnach and Hutchison, *sp. nov. Caules demum pendentes lateraliter ramosi prope basin teretes sursum plani et alte serrati, lobis oblique ovatus obtusis; areolae basi sinuum sitae, lana alba praeditae, raro 1 vel 2 spinas minutas gerentes, folio subtendente squamiformi inconspicuo; flores nocturni campanulato-infundibuliformes, pericarpella minute tuberculata, areolis lanatis spinas usque ad 4 mm. longas gerentibus, receptaculo alibi fere espinoso, sursum curvato, perianthii segmentis exterioribus crassis cymbiformibus brunneo-viridibus, interioribus tenuioribus albis; fructus oblongo-ovoideus ca. 4 cm. longus primum viridis demum ruber, podariis humilibus, areolis cinereo-albolanatis spinas 40-60 aciculares bruneas usque ad 11 mm. longas gerentibus, perianthio persistente; semen ovale apice oblique truncatum paullo complanatum minute punctatum obscure nigrum, hilo non depresso albo.*

Plant epiphytic, of semi-repent habit by repeated branching and rooting; main *stems* to 90 cm. long, the lateral branches directed forward at *ca.* 45°, the main and secondary stems at first ascending, then pendent, often with aerial roots on underside of midrib, the terete base 1.5 cm. thick and 4 to 13 cm. long or shorter on lateral branches, above flat and deeply serrate but sometimes interrupted by terete reversions to 10 cm. long, the lobed stems 10 to 15 cm. wide, undivided central portion 2 to 3 cm. wide, the midrib to 5 mm. thick, the lobes directed forward at *ca.* 45°, obliquely ovate, obtuse, the upper edge nearly straight, the lower barely S-shaped, 4 to 5 cm. long, up to 3 cm. wide and 2 mm. thick, the sinus between lobes 1.5 to 2 cm. wide; matured epidermis grass-green, on growing tips bronze-shaded and edged with light maroon; *areoles* at bottom of sinuses, 0.5 mm. diam., the wool white, subtended by a minute maroon scale bordered with a colorless membrane; *spines* usually absent, sometimes present on terete stems or more rarely on lobed stems, 1 to 3 to an areole, 2 to 4 mm. long, acicular, straight, reddish brown; *extra-floral nectaries ca.* 2 mm. below areole, dark maroon, nectar-producing on newest growth.

Flowers on apical third of each branch, single on areoles flowering for first time, the receptacle on pendent stems abruptly bent upwards just above the pericarpel and above that slightly upcurved, nearly straight on the rarely flowering ascending stems, campanulate-funnelform, the exterior pale greenish bronze shaded with maroon, the perianth segments light cream, the whole flower 6 to 7 cm. long, the limb 3 to 4 cm. wide; *pericarpel* 8 to 12 mm. long, 8 to 10 mm. wide, yellowish green (Pod Green 061/1)* on under surface, yellowish pink (Naples Yellow 403) above, with 23 to 32 light maroon (Oxblood Red 00823/1) tubercles 3 mm. wide and 0.75 mm. high on upper side of pericarpel and half as high on underside, becoming progressively larger towards perianth,

*Capitalized colors are from the Royal Horticultural Society Color Chart

very shortly decurrent, dispersed 5/8 or 8/5, the scale deltoid-acuminate, 0.5 mm. long and wide, dark maroon (Garnet Brown 00918), erect or appressed to the subtended areoles, these with wool and spines, the wool mass 1 mm. diam., the hairs 0.5 mm. long, grayish cream, the spines 5 (1 to 10) at each areole, longest and most numerous on upper side of pericarpel, nearly or completely lacking beneath, acicular, straight, thin and flexible, directed toward perianth and extending from pericarpel at *ca.* 45°, 1 to 4 mm. long, longest on tubercles nearest perianth, darkly stramineous in apical two-thirds, white below; remainder of *receptacle* 2 to 3.5 cm. long, 5 to 6 mm. wide just above the pericarpel, the portion surrounding nectary chamber 1 cm. long, to 8 mm. wide, narrowing above to *ca.* 6 mm., at tube mouth 1.5 cm. wide, brownish pink (Yellow Ochre 07/3) on upper side, yellowish green (Pod Green 061/1) beneath, smooth and shiny, obtusely ribbed by indistinct podaria 1 to 2.5 cm. long and 3 to 4 mm. wide, the lower scales ascending, the upper at right angles to tube, brownish maroon (Oxblood Red), darkest along center and at tips, the lower scales ± deltoid, lower 2 to 4 scales with 2 to 7 spines up to 4 mm. long, these progressively decreasing in size and number above, absent on uppermost podaria, the upper scales ovate-obtuse, 5 to 8 mm. long and wide, lowest half of them subtending rudimentary wool; *outer perianth-segments ca.* 16, the lower ones recurved, ovate-obtuse, stiff and fleshy, cymbiform, very concave on inner face, the upper becoming ovate-acute, thinner, ascending or appressed to inner segments, slightly keeled near apices, minutely mucronate, 10 to 22 mm. long, 5 to 9 mm. wide, maroon (Oxblood Red 00823/1) along center and at apices, pale bronze (Naples Yellow 403) near margins; *inner perianth-segments ca.* 17, ovate-lanceolate, mucronate, *ca.* 2.5 cm. long, 8 to 10 mm. wide, flat, diverging *ca.* 30° from axis of receptacle tube, the apices more spreading, light yellowish cream with a faint greenish tinge, somewhat translucent, the mucro to 1 mm. long; *ovule chamber* ellipsoid, 5 to 7 mm. long, 4 mm. wide, the funiculi branched, multiovulate; *nectary chamber* ellipsoid, 1.5 cm. long, 5 mm. wide, filled with colorless, rather ill-smelling nectar, the nectaries linear, thickened, protuberant, yellowish, at top of chamber merging for 3 mm. into a smooth, whitish, laterally fused band, above band the lowest stamens inserted at one level in a ring, remaining stamens inserted in two separate zones, the majority, inserted in the lowest zone, extending upwards from the basal ring for *ca.* 1 cm., fewer above this, lacking below mouth, a single ring of filaments at the mouth, the free part of all filaments declinate, terete, creamy white, becoming pink on side of receptacle nearest strongest incident light, the upper *ca.* 17 mm. long, extending to within 7 mm. of apex of perianth, the lower 2.5 cm. long, the non-free bases almost completely coalescent, forming a white membrane adnate to receptacle wall; anthers rectangular, light yellow, 1.5 mm. long, 0.5 mm. wide; *style* up to 5.5 cm. long, 0.75 mm. wide, upper 3 mm. and base thickening to 1 mm. wide, cream, the stigma-lobes 8 or 9, hardly expanding, evenly and lightly papillose on all surfaces, slightly grooved on interior face.

Fruit (2 observed, set with pollen of *Werkleocereus tonduzii* (Web.) Britt. & Rose, *ex. hort. U. C. B. G. No. 52.1079*) directed above or below stem-plane, pressing against adjacent lobes, the latter becoming creased, oblong or slightly ovoid, somewhat umbilicate at both ends, up to 37 mm. long and 31 mm. wide, the epidermis between areoles smooth and somewhat shiny, bronze-green for six months following pollination, then red with a tinge of maroon, the color spreading from base to tip within 4 days, the podaria *ca.* 30, evenly distributed *ca.* 1 cm. apart, up to 2 mm. high and 1 cm. wide, bases inconspicuously decurrent, very obtuse, the scale hidden by areolar wool, the areoles pointing forward at 45° from main axis of fruit, circular, 1.5 mm. wide, the wool *ca.* 1 mm. long, curling, gray-white, the spines fewest on upper and lower areoles, 40 to 60 from each, radiating in all directions and ± evenly distributed but slightly longer and more numerous at upper end of areole, straight, stiff but very thin, 5 to 11 mm. long, cream when young, later brown; perianth persistent, decurved, 4 cm. long, brownish cream; pericarp *ca.* 3 mm. thick, red, easily separable from the inner pulp, this white, odorless, tasteless, completely and densely filling fruit, containing numerous evenly distributed seeds.

Seed flattened-ellipsoidal with an obliquely truncate hilar end, 1.5 to 2 mm. long, 0.75 to 1.25 mm. wide, 0.5 mm. thick near hilum, 1 mm. thick at the opposite end, slightly keeled along both edges near hilum; *testa* minutely pitted, jet black, rather dull; *hilum* oblique to main seed-axis at *ca.* 45°, somewhat curved, not depressed, 0.5 mm. long, cream; *micropyle* inconspicuous and not depressed.

Southwestern Costa Rica, El General Valley: near Cañas, epiphytic in scrubby forest, collected by C. H. Lankester, *ex. hort. University of California Botanical Garden 52.1083* (UC-Holotype, US); borders of Rio Peñas Blancas, 700 m. alt., Feb. 12, 1898, *H. Pittier 12076* (US 795907); "El General," *ca.* 500 m. alt., Sept., 1921, *C. Werckle* (US 2215129).

From *Werckleocereus tonduzii* (Web.) Britt.

& Rose and *W. glaber* (Eichl.) Britt. & Rose this new species differs in the following: the stems are flattened and deeply lobed; the upper half of the receptacle is devoid of spines and with fewer and longer decurrent podaria; the fruit is oblong and red.

The specific name *"imitans"* emphasizes its close resemblance in stem characters to *Epiphyllum anguliger* (Lem.) Don, *E. chrysocardium* Alex., *E. darrahii* (Schum.) Britt. & Rose and *Cryptocereus anthonyanus* Alex. There seems to be two separate instances of its having actually been mistaken for *Epiphyllum anguliger*. One case, our own, we have already mentioned; the second demonstrates its misleading resemblance even better. In 1905, in an article on Costa Rican cacti, C. Wercklé* concludes his remarks on Epiphyllums by saying: "In the southwest of the country I have seen *P.* [*Phyllocactus, i.e., Epiphyllum*] *anguliger*, or a very similar species, but without flowers." Mr. Lankester, informed of this statement, writes that to his knowledge there is no native cactus with stems resembling those of *E. anguliger* except our new *Werckleocereus*, which was also found in southwestern Costa Rica. Neither does subsequent literature mention a cactus with such stems as being native to areas outside of Mexico.

The specific name is also apt because the flowers of *W. imitans*, while best accommodated in *Werckleocereus*, are aberrant there, and in some respects more closely resemble those of *Eccremocactus* and *Weberocereus*. The significance of these resemblances will be discussed elsewhere.

Britton and Rose examined the Pittier collection, which was sterile, and concluded it must be a new species of *Epiphyllum*. They sent a photograph of it to Wercklé and, finally, in 1921, Wercklé collected the species and sent to Washington, D. C. a fruiting stem, which, however, died. Wercklé said of this material "it was brought from the Indian District in the southwest of the country——." We have not seen the preserved remnants of this material, if they are still extant. The Wercklé specimen cited above may be of the same collection, but is from the herbarium of Otón Jiménez L. of San Jose, Costa Rica. It differs from the measurements given in our description only in the stem lobes which are to 6 cm. long, more symmetrical, often barely broader at the middle and usually more rounded apically. It, also, is sterile, but there are several seeds in a pocket on the sheet which agree in morphology with those of *W. imitans*.

Britton and Rose prepared a fragmentary description of the material known to them, as a new species of *Epiphyllum* named for C. Wercklé. This typed description and accompanying data are attached to US 2215129, cited above. They described the fruit and seed very briefly but do not mention the fruit spination! Apparently they never published the species because they were unable to examine flowers.

The pungent odor of the flowers of this species, somewhat reminiscent of wet paint, is distinctly unpleasant and strong enough to be quite noticeable from a distance in the early morning. This strong, often unpleasant odor and the short, rigid receptacle of the flowers of *Werckleocereus* and its allies *Weberocereus* and *Eccremocactus* suggest that in their native habitat they may usually be pollinated by bats rather than by moths. Porsch*, an authority on flower pollination, has stated that most long-tubed, nocturnal cactus flowers with their pleasant scent, deeply hidden nectary chamber and prominent white perianth are usually pollinated by moths which, attracted by the scent and sight-guided by the perianth, are able to reach the nectar with their often very long probosci. He states that the nocturnal flowers of *Pilocereus, Cephalocereus,* and *Lemaireocereus,* on the other hand, are usually ill-smelling, with a short, rigid receptacle and a reduced perianth. In other families many species with flowers of this type are definitely known to be pollinated by bats. These, depending more on smell than sight, do not require a prominent perianth as a sight-guide, and they can obtain the nectar by vigorously thrusting their head within the flower and lapping with their rather short tongues. The flowers must be rigid enough to withstand this treatment. Porsch therefore states that bats may seek out cactus flowers of this type also, though there is no record of their doing so. Perhaps field observations will eventually confirm his theory.

At this Botanical Garden, *W. imitans* has grown well in a hanging basket in our orchid house. It responds to rich, well-drained soil and much water. When underwatered the stems become narrow and lose most of their distinctive serration. However, a slightly drier culture during our mid-winter (Nov.-Jan.) seems advisable to facilitate setting of flower buds. When buds appear, heavy watering must be resumed as they easily abort if the plant becomes dry. Flowers have so far appeared only in March of each year. They begin to open about 4 P. M., are fully expanded by 9 P. M. and close about 9 A. M. next morning. While they last only one night, younger buds continue to develop so that the blooming season lasts four to six weeks.

*Wercklé, C., *Monatschr. für Kakteenk. 15: 181, 1905.*

*Porsch, O. "Die Bestäubungsleben der Kakteenblüte," *Cactaceae, Jahrbücher der Deutsche Kakt.-Ges. 1939: 119-133, 1939.*

THE FIRST SIX MONTHS OF AFFILIATION

The date of affiliation of the New Mexico Cactus and Succulent Society, January 20, 1956, was also the date of our first anniversary. Our birthday party was that evening at the home of Viola and Leon Blake, where the Society had held its organization meeting. Following the business meeting, President Prince Pierce gave a very interesting talk on Mammillarias, passing around large drawings of spine types, and displaying specimens from the Blakes' greenhouse. Viola Blake, retiring president, was presented with an Obregonia. During the social hour we had individual birthday cakes, each with a tiny candle, and were invited to choose birthday gifts from an array of aluminum-foil pattypans full of seedling cacti and succulents. After all had made their selections, Viola looked over the remaining pans, picked up one and exclaimed, "No one took the Navajoa!"

In April, the Barber's Supermarkets invited Albuquerque's fourteen garden clubs and our society to enter planters in a show for a week at their six stores. There was plenty of competition but we won a first and a second prize (total $35.00) with planters filled with succulents by Prince Pierce and Viola Blake.

Also in April seven members went on a collecting trip in the foothills of the Sandia Mountains east of town, finding *Toumeya papyracantha, Coryphantha arizonica, Mammillaria wrightii* (only two though those had been the special aim of the trip), several *Echinocereus triglochidiatus* in bloom and as an extra dividend to an enjoyable excursion, observed a desert bird's nest on the ground containing three balls of fluff with gaping beaks. Prince got a picture of the tiny birds. We ate lunch in the Juan Tabo recreation area near our hunting grounds. As so much of the land is staked out for real estate development we felt free to take all the cacti we could find.

The Albuquerque Council of Garden Clubs invited us to participate in their spring flower show on Mother's Day, May 13, in the First National Bank. They allotted us a five foot square table in a corner of the lobby, the same as last year, for an educational exhibit. We piled the table with vermiculite, held in place by boards along the edges, and buried the labeled specimens up to the rims of the pots so the result was more attractive than row on row of pots. Members contributed cacti and/or succulents, labor, and transportation, and the vermiculite was sold at cost at our next meeting. The theme of the flower show was tied in with the city's 250th anniversary celebration, "Old New Mexico," and our president worked with the theme chairman, furnishing cacti for a patio garden in front of a painting of an old church dome for the show by artist Ted Schuyler. As we could not be sure of securing a blooming Yucca, the state flower, at the right time, the artist painted one in front of the church.

On May 27th eleven members went on a collecting trip for *Pediocactus simpsoni* organized by Dr. Edward F.Castetter, our honorary member, dean of the University of New Mexico graduate school and also, since the beginning of July, academic vice president of the U. It was a most enjoyable trip, barring the flat tire on John Grainger's red truck, the five miles on a bumpy forest road, the mudhole Dr. Castetter's truck got stuck in, and the early rising to leave town by six a.m. to meet John Grainger from Taos who was our guide to the location, some 120 miles northeast of Albuquerque. The Pediocacti were so numerous we had to walk carefully to avoid stepping on them. On exploring the mountainside we found *Mammillaria viridiflorus, M. meiacantha, Echinocereus triglochidiatus,* miscellaneous Opuntias and Sedums. Some of the viridiflorus, "trigs" and a yellow-flowered Sedum were in bloom but the Pediocacti had finished blooming.

Our meetings are held the third Friday of each month at the homes of members. Programs since the January meeting have included the showing of Slide Sets No. 1 and No. 2 from the National Society and slides taken in Mexico by member Jane Cowper; also slides of last year's flower show exhibit taken by Viola Blake and various cacti and succulents (and the birds) taken by Prince Pierce, Ocotillos and others by Ken Gibson and Ann Sherman. And, of course, there is also a viewing of collections, indoors and out, of our hosts at each meeting. The June meeting deserves special mention as we were treated to a talk on New Mexico Opuntias by Dr. Castetter. He also showed slides of Opuntias growing in different parts of the state and brought cuttings of *Opuntia grahami, O. fragilis* and *O. erinacea* which he found no trouble to dispose of among those present.

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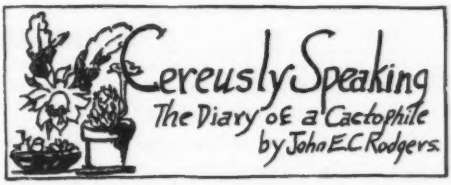
Editor's Note: This interesting report makes us all want to move to New Mexico and join the active Cactus and Succulent Society. We hope that the photographers in their group will send photos of their native plants for the Journal. We are also looking forward to a paper by Dr. Castetter on the Native Cacti of New Mexico.—S.E.H.



I'm a born experimenter as I've often stated in this column. When I hear that there is one soil suited to the Xerophytic clan, I examine my records of successes and failures. I am still not convinced that One soil would have turned my failures into successes. The soils I use must be "hung-out", set-out", and "selved-up" in summer to take rain and more rain for the first two and varying degrees of care for the third.

Epiphytes, small, medium and large are hung out. The soil for these must hold moisture but not remain wet so that the air circulates freely through it. The small pots of succulents (and cacti) are also hung-up but the soils are more compact (bank sand, leafmold, etc.); this type of soil dries out more rapidly and will take more water without injury to the plants. The columnar types are set on the ground if plants demand more moisture and on concrete or stone if needing less moisture. The south-westerners, rarities, and immovables (because of size) stay in the greenhouse where I can control the water intake.

The soil for this last group, like that of the columnar types, varies from "strong" calcium through neutral to "low" acid types. I used Dr. A. D. Houghton's "The Cactus Book" (1930) chapter Conspectus of Species as my guide which contains a column on soil requirements (chalk, humus, lime, and sand). Although Watson's "Cactus Culture" came into my possession much earlier (1932) I have used the Houghton book more often. Now I also study Marshall and Bock's "Cactaceae" (1941) and "Cacti" by Borg

(1951). These books do not advocate one soil unless it is a basic type with as many alterations as most of us use; it is no longer one soil "in my book". I do not care for the too complex, non-enjoyable types of gardening, neither do I care for the easy shrug-of-the-shoulder type. My thesis is that if all plants grew in the same locality, then we'd be right in assuming some things but not all. I've seen hummocks in the Bergen Swamp near Rochester, N. Y., covered with terrestrial orchids while a few feet away another such hummock would be orchidless and have another group of plants on it. If I collected from these hummocks would I be justified in using the same soil or would I study the two and see how they differed? The reason why the German botanists were so thorough was not that he travelled all over the world but that he took samples of soils, notes on altitude, plant relationships, as well as many other pertinent facts. Some call this plant knowledge "green thumb" but I'm sure that the very name "green thumb" means long hours with plants, examining growth, making written or mental notes, etc.

I've talked to growers, dealers, and collectors here and in Canada and I have come to the conclusion that the "faddist" has no place in Xerophytic culture but the sincere study of the soils is what is needed. The thing that distresses me is that so many collectors lose a plant and replaces it without any regard for the reason of his loss.

With the soil testers available, it is possible to tell the degree of acidity or basic qualities of soils. Using litmus paper is also another less arduous way—blue litmus turns red in acid and red litmus turns blue (soil must be moist when litmus is used. Fortunately for most of us, the average soil is slightly on the acid side. In general, oaks indicate acid humus; maples a slightly acid to neutral humus which when mixed with sand can be used for most plants as is; beech trees grow on calcarous types of soil or underlying rocks; pine needle humus is acid (for you westerners the conifer regions).

If the subject of one soil for my plants is implied I do not wish it so. I do think soils can be too diversified and thus become a fetish as well as a burden which eventually ruins the collector's zest for his plants.

I wish to state here that the soils I use are based on long and often discouraging experimentation. Humus is one thing that I have found lacking in many soils I've analyzed that have been compounded by growers and collectors who have assumed that deserts or semi-arid places are sand. Burn or roast any sample of soil and sniff the results. The burning-leaf smell is there as well as the black charred materials which show that humus or organic materials are present.

The lack of humus, the cacti in full sun and no water, the thick-as-grass cacti growing in the Southwest, and many other fallacies are slowly giving way to a more sane approach to our hobby. I, for one, travel, talk, and study my subject from every angle as well as keep notes and diaries; with all this "work" I have never been tempted by any other group of plants. Give me the pioneer spirit of Xerophytes. They have conquered semi-arid, pampas, veldt, rain-forests, and mountains—versatile is my word for them.

Miniature Opuntias

By MARY GLADE

From Cactus Chronicle

Many people refrain from growing Opuntias because numerous species of this genus grow too large for the average garden. In this very large genus one will find many very interesting species which may be grown in pots or a small garden.

The majority of these dwarf species available in this country are native to South America. Among these are O. floccosa with beautiful white hairs; O. soehrensii with green roundish joints, slightly raised aeroles with straight, flexible spines; and O. vestita called the old man Opuntia.

From the U. S. and Mexico one will find a number of interesting species which cannot definitely be called miniature or dwarf but they are very low growing and fit well in this group. There is O. microdasys albata which is spineless but has areoles filled with cottony white glochids which do not stick; O. brachyclada in the Basilaris series with its beautiful large flowers; O. clavata with white spines and O. parishii with red young spines; O. pulchella having purple flowers and O. fragilis which has small white areoles but flowers rarely. O. salmiana from South America supposedly grows to about 3 ft. but the stems are so fragile that the wind keeps it to about a foot high in unsheltered positions. One variety has lovely white flowers with a pink stripe.

Many species have exquisite flowers in brilliant colors. While yellow is the more common color, several of these dwarf species have red flowers, such as: O. microdisca, teres and verschaffeltii.

In this group I have included the sub-genus Tephrocactus, most of which are native to Argentina. There are about a half dozen species of Tephrocactus available in this country. T. glomerata is especially desirable with its long paper-like spines, while T. strobiliformis is quite an odd species having blue-grey smooth branches. It has been commonly called "spruce cones."

Most species are of easiest culture as they grow either in rich or poor soil—full sun or part shade. For best results one should use reasonably poor sandy soil with moderate waterings and a sunny position. When grown indoors in shade or in rich soil they grow so rampantly they lose their character.

Propagation of this genus is simple as many species have easily-detachable pads or branchlets which root quite easily.

With the interesting variations in spines, pads or branches and flowers in this group of Opuntias, one could gather a unique and uncommon collection.

SPOTLIGHT ON ROUND ROBINS

It does not seem possible that I am beginning another year with the Robins, but it is true. However, much remains untouched which I had hoped to do. Perhaps another year will find the stray ends have been caught up.

We now have twelve active Robins with, in most cases, full memberships. Two of these, International R. Robin No. 2 and Cactus and Succulent R. Robin No. 8, are new this year. In addition there are several other not yet ready to fly.

Of the eight unaccounted-for, original Robins, five have completely vanished, leaving no record. These were Mesembrianthema, Echeveria, Succulents Only No. 2, Let's Exhibit, Haworthia Robins. Rain Forest Plants, Mammillaria, and C. & S. No. 5 Robins are recorded but inactive. Many reasons might be given for the failure of Robins but one probably is insuffiicient material for discussion.

By chance, if any of the former members of the above Robins are interested to rejoin another group, I should be glad to hear from them.

Of the new Robins, I am pleased that we have at last made a start on one of the two International Robins for advanced collectors. The one suggested by our New Zealand member, Mr. A. B. Cutler, on Small Cacti annd Mimicry Succulents, has gathered several members besides Mr. Cutler who has a 65 ft. glasshouse full of these interesting plants. Mrs. Brent Mott of Arizona is the Director. She has a plant house for the protection of the less hardy ones in winter and has blooms on something the year 'round, she says. Mrs. Doreen Murphy of Edinburgh, Scotland, has less space to work with but has an intresting collection of mimicry plants, and specializes in rare plants. I hope, at this time, that Mrs. M. E. Shields, of New Zealand, may be persuaded to join this Robin also, as she has a fine collection of plants. It was she who suggested the other International Robin which was to have members from all countries; a world-wide, interesting Robin. As she said, "What a Robin to belong to!" Unfortunately, there has been not an inquiry from any one of our Journal members in other lands. This Robin would have a general subject of cacti and succulents until such time as the members chose another, if their interest lay in a special field. I should very much like to hear from those who are living abroad, are members of our Society, and who would be interested in joining this fine Robin. Six members would start this one off well. There is a space for several members in the Small Cacti and Mimicry Succulents Robin, if some of you who grow these wish to join. Just let me know and you will be placed promptly.

I have on file also a request for an Epiphyllum Robin from Mrs. D. A. O'Callaghan, Surrey, England, who says, "They are my favorites among cactus." If any of you are interested in this same subject, drop me a card. By experience it has been found that other plants ought to be included for a more rounded discussion during the year, Epiphyllums being active only part of the twelve month period. When you write me you might suggest what other plants you would like to have included. Six more members would be needed for this.

New members include Mrs. Ralph Campbell, Colorado, who joined Succulents Only Robin and the reorganized C. & S. Robin No. 6 which is again directed by Mrs. Billie Marie Anderson. Miss Alta A. Tarango, San Pedro, California asked to be placed in the Desert Dish Garden Robin as well as the Decorator's Robin. Mrs. Arlene Phillips, Lodi, California, whose letter just arrived, will be placed as soon as possible. Mrs. Norma Lee Cole, San Bernardino, California, has asked to be placed in the Decorator's Robin. Her hobby is using succulents in flower arrangements.

News of our individual Robins turned out to be different than I planned. The International Robin No. 1 is just too late to report it this time and will have to wait another round. Those notes I have are from Robin No. 8, only.

Maude Cogswell reported that she uses no soil in her greenhouse, the base being peat moss. It would be interesting to have a few more details as to what she grows and how successful she is. She speaks of having good luck with seed of Orchid Cactus and Stone Faces (Lithops).

Elizabeth Swain, now taking a trip west as this is written, says she has a "Cactus sitter" for her plants while away. She has added to the previous information she gave in regard to the Crassula argentea which was written in an earlier issue of the Journal. She writes, "that when it gets to be about two feet high and the trunk is as thick as your wrist, it will bloom, given the proper treatment." In addition she gave this hint which is worthy of note, "I have tried a bit of limestone gravel (get from the chicken feed dealer) with loam, sand and leafmold. I have a beautiful little Titanopsis calcareum and I find it likes this gravel packed on top of the pot around the rosette."

Beware of nematodes! That is what the Director of this Robin, Miss Marian Fox, would most certainly say, as she has had much trouble with them in her collection. After the tedious process of sterilizing and renewing all the soil and cutting off the roots of her plants and rerooting them she has finally begun to have the upper hand. Nematodes stunt plants and cause nodules on the roots, and the only sure way to be rid of them is removing the roots and sterilizing everything. It is not even possible to throw away the poor soil since unless it is sterile, it would contaminate everything all over again: wherever it is placed. If any of you are not familiar with this serious pest, or may have hurried over the article "A New Cactus Pest in England" by C. E. L. Gilbert, in the January issue of this year, do go back and read it. Eelworms are the same as Nematodes to us. It is a rather gloomy note on which to end my report but everybit of knowledge is useful.

I am very grateful for the co-operation I have had from those Directors who volunteered to send me information on their Robins, or have sent me the Robins to read and report from them personally. Thank you all very much. And to many of our members who have said kind things in their letters about this column I send my thanks also.

Until the next time may all the Robins fly fast and well.

(Mrs.) Gladys H. Panis
P. O. Box 705, Falmouth, Mass.

NEW CACTUS CLUBS

Mrs. A. Phillips, 333 Acacia, Lodi, California, and Fred A. Kenneth, 12530 NE 4 Ave., North Miami, Florida, would like to contact members living near them. Both are anxious to start local cactus clubs.

PHOTOS WANTED

I need good 8 x 10 glossy prints of cacti and succulents, not too rare plants, so that I can work them into stories for my magazine columns to stir up interest in cacti and succulents. For examples, I can use *Crassula argentea,* Bryophyllums, and Kalanchoes.

Victor Greiff
159 Beach 142 St.
Neponsit, L.I., N.Y.

THE CACTUS GROWING STORY

By HOWARD E. GATES

Photos by author in his nursery at Corona, California

The growing of many kinds of cactus and succulents begins with the gathering of the seed. Some kinds produce their fruits in one big crop while others scatter along a few fruits at a time for several months. The harvesting of the fruit is almost a year 'round task as there are few times when none are maturing. The first illustration shows the gathering of *Euphorbia obesa* seed. The female plants bear three seeds in each of the fruits, which explode and scatter the seeds in every direction. Double cones of plastic screen are placed over the clusters of fruits to catch the flying seed. The top of the inner cone is cut out to fit the plant snugly. *Aloe variegata* is another troublesome one to gather. The seed is merely a dark dot in the center of a half inch disk of white tissue paper wings. As the pods begin to crack open, they are gathered and placed in screen cages to dry or else the seed would scatter to the four winds.

Cactus growers have a large investment in seed producing plants in order to keep up a continuing supply. Some species must be very old before they begin to produce seed. Probably ten years for *Mammillaria compressa.* The beautiful *Echinocactus grusonii* shown in the company of the young lady, were more than twenty years old before they produced their first fruits. It is necessary to supplement the seed produced locally by purchasing seed from foreign dealers or making long collecting trips into the back country of Mexico.

The seed cleaning and storage room is one place that is always kept under lock and key. Many of the seeds, especially Mammillarias, are worth several times their weight in gold. As the smaller types of fruits are gathered, they are placed in small open boxes to dry and hold

FIG. 123. *Echinocereus grusonii*

FIG. 122. Gathering *Euphorbia obesa* seed

until enough have accumulated to justify washing out. The large fleshy fruited types of *Cereus* must be washed out at once. The pulp from the fresh fruits or the soaked dry fruits, is placed in a hemispherical screen set on the top of a bucket. Then a jet of water is applied to break up the pulp and wash the seeds through the screen into the bucket. Most cactus seeds will settle to the bottom and the suspended refuse may be drained off in the water. A mucilage-like substance which clings to many types of seed, is washed off by placing them in a screen with mesh too small to permit the passage of the seed. When sufficiently cleaned, the seed are poured out onto a cloth where they are dried until they can be stored without moulding. The hard dry fruits of *Faucaria* and *Pleiospilos* are ground up in a home flour mill with the plates set far enough apart to prevent crushing the seeds. Then they are screened out and given a final water separation.

FIG. 124. Seed cleaning and storage

FIG. 126. The seedling house

Some kinds of seeds are ready for planting very soon after cleaning. Other kinds require rest periods of varying lengths before they are ready to germinate. Strangely, the large seeds of the Mexican cereus types lose their viability much sooner than the small seeds of some South American cereus. It is profitable to run germination tests before planting seeds to ascertain if they are ready. Very poor results are obtained when seeds are planted during their resting period.

Growing from seed is so painstaking and requires such good facilities, at least seventy-five per cent of all the seedling grown stock sold in this country, is produced by only three out of the many cactus and succulent growers. Every grower has developed his own technique, so they may not agree in all points with the system described. A first class glasshouse is set with thermostatic controls for an air temperature of seventy degrees. At one side is a bench with a capacity of over a hundred germinating flats, which has additional bottom heat to insure a soil temperature of at least seventy degrees. Every effort is made to keep this house disease and pest free as on this depends the success of all further operations.

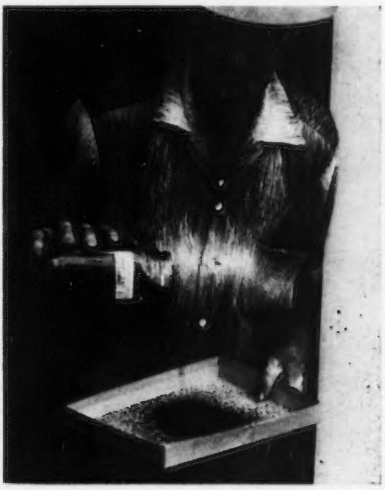


FIG. 125. Checking *Trichocereus spachianus* seed

FIG. 127. Transplanting seedlings

FIG. 128. The planting room

The soil for the seed flats is a mixture of wind blown sand, peat moss and fertilizer as developed by the plant pathology department of the University of California at Los Angeles and known locally as the UCLA mix. It is a further refinement of the soil known in England as the John Innes Mix. This soil is carefully prepared and steamed in the flats before using. The seed are sown on the smooth surface of this soil mixture, pressed in lightly and then covered with various sizes of washed and sterilized sharp sand. The depth of cover varies with the size and type of seed. Some germinating plants will push themselves out of the soil if they are not covered to a proper depth. Others which are tall and slender in the cotyledon stage will fall over. After planting, the seeds must never be allowed to dry out, so the flats are mist sprayed several times a day and when bottom heat is being used, again just before bed time. After germinating they must be cared for very carefully. A cactus seedling is not much more than a drop of water with a skin around it for some weeks after germinating. Too much water will build up harmful salts in the soil or give the proper conditions for the various soil borne diseases to develop and cause "damping off" or similar troubles. Frequent sprayings with a fungicide help to keep these diseases under control. A few cut worms, crickets or a stray grasshopper can raise havoc with a flat of seedlings.

FIG. 129. Sorting *Chamaecereus*

Most cactus seedlings are very slow growing. For weeks some kinds can hardly be distinguished from the grains of sand. Three to nine months after sowing, depending upon the kind, they are ready for their first transplanting into flats which hold several hundred plants. This is the most touchy stage in their life time and the losses are very heavy at times. There is a great difference in the resistance to disease in the various species. All annual garden plants and many perennials are grown and sold in less time than it takes to bring cactus and many succulents to their first transplanting. Cactus are very irregular in their rate of growth so it is necessary to grade them to size every time they are re-set.

All the transplanting is done by women in a specially built room set aside for the purpose. Men do not like the tedious task of spending

the whole day with tiny plants. The illustration shows Eva on the left, setting small seedlings, while Alice and Lucille are digging and sorting small *Chamaecereus* cuttings that have just been rooted. The closer view shows Alice at the task of digging and sorting. Rubber gloves are very satisfactory for handling the small plants. They must be gently caressed and not hugged tightly. You will note that it is customary in Southern California, to use redwood flats that are eighteen inches square and nearly three inches deep. Only two soil mixes are required for the several hundred different kinds that are grown. These are very porous mixtures of a neutral rather than either an alkaline or acid reaction. All soil used in the various types of containers is heat treated.

After transplanting, the flats of small seedlings do time in the large glasshouse until they are well rooted and growing again. In this nursery, seven thousand square feet of glasshouses are usually jammed full of tender plants that need their protection. Larger specimens of tropical kinds are grown in cans in the center of the benches. Cactus do need water as well as food, heat and light. The water must be applied with discretion. The fellow that tells a cactus nursery-

FIG. 130. Large glass house

FIG. 131. A lath house

FIG. 132. *Echinocereus grusonii*

FIG. 133. Preparing ground beds

man that he can do the watering has the best chance of getting a position. Harold, who is doing the watering, has been working with cactus and succulents ever since 1942. He has never had another job in his life.

After being well established in the several better types of houses, the flats of the hardier types are placed on concrete bars in one of three large lath houses to grow on to market size as shown here. Tom, another long-time employee, is going after the weeds which insist on coming up. A reputation for having a weed free nursery is highly prized as it is an indication that the plants are also kept free from pests. The cheapest time to kill a weed is when it is just big enough to see. Watering is done in the lath houses with travelling sprinklers which walk along a hose stretched down the path.

Here after two years of growing and two transplantings, is a flat of *Echinocactus grusonii* that is ready to start going to market. Globular plants should be an inch and a half in diameter and erect types, two to three inches high before they are ready for shipment. Some kinds require three years of intensive growing to reach these sizes. A few even more. During the growing

FIG. 134. The "Contraption"

FIG. 135. Planting ground beds

period, spraying several times a year is necessary to eliminate mealy bugs, scales and other pests.

An acre of ground beds is protected from the wind, sun and rabbits by a plastic screen-covered house. The cute little bunnies from the hills, are very good customers whenever they get the chance; no plant seems to be too spiny for them to work on. One picture shows Robert finishing off a bed after soil fumigation. These beds are treated with Methyl Bromide or Vapam every time they are replanted to cut down on weeds, soil pests and diseases. It is a slow laborious and costly process but it pays off in better and cleaner plants.

Many of you know the difficult back breaking job of planting wide ground beds. The planter is usually leaning on one arm while wishing for another arm or else falling on his nose. We have a contraption invented and built to take some of the troubles out of the planting projects. This cart or whatever you may want to call it, may be easily pushed along as the work progresses. The close up view shows better how the work is done. Sections of two by four-inch mesh wire are laid on the ground for spacing. Close planting is done by setting two plants in each mesh space. One plant is set in the opposite ends of adjoining spaces for wider spacing. This is only one of the many ideas that have been developed to keep prices down in the face of the more rapidly rising costs. Automation has not reached the plant growing business and probably never will eliminate most of the hand work.

The picture of the two hands shows the packing foreman selecting a nice *Espostoa lanata* from a bed containing thousands of them. This woolly old man from South America is a very popular and satisfactory plant. A full view shows him digging a five year old plant of *Cleistocactus hyalacanthus*. This is a splendid plant for both indoor growing everywhere and outdoors in mild climates. Freddie never had another job except when Uncle Sam tagged him for the Army. He hoed weeds, made cuts, sterilized soil, sprayed and did about every one of the many kinds of jobs there is in a nursery before he took charge of the digging and packing.

After all the growing is done and the plants are dug, they must be dried for at least twenty-four hours before packing for shipment. In wet weather this process is hastened by circulating heated air over the plants in a dryer. Then the soil is shaken off and the plants for wholesale shipments are put to bed between sheets of paper placed between blankets of shredded paper. Plants for shipment to fanciers are indi-

FIG. 136. *Espostoa lanata*

FIG. 137. *Cleistocactus hyalacanthus*

FIG. 138. Wholesale packing

vidually wrapped and packed in shredded paper. All packing is done in a room specially equipped for the purpose. There is no sense in growing a good plant unless it is to be packed properly. All reliable growers will guarantee safe delivery of their plants at any time except during the Christmas rush when they may be delayed and exposed to freezing temperatures. However they cannot guarantee them to grow as they have no control over their culture.

All of the leading cactus and succulent growers are in the business because they like to grow these plants. Probably they all could have entered more financially profitable occupations. Every one of them has beloved plants which he would not sell at any price. This story closes with a view of the author in his Lower California Botanical Garden beside the finest Creeping Devil (*Machaerocereus eruca*) known to be in any collection. Beyond him are the tall clustering arms of *Lophocereus gatesii,* one of the four species of plants that bear his name in recognition of his years of botanical exploration. He hopes that after this series of pictures and brief remarks, that you will realize that cactus and succulent growing is a skilled profession that requires good equipment, a long time and plenty of work.

FIG. 139. Howard Gates in his auto-wagon can well be proud of this fine specimen of Creeping Devil *(Machaerocereus eruca)* which he collected in Lower California years ago. Howard is one of the three oldest (in membership years) Society members and has served as President, Board Member, Convention Chairman, and many other capacities where he could further interest in succulent plants. Ed.

K.I.O. CACTUS CLUB

Our meeting room is in the Irwin M. Krohn Conservatory, Eden Park, Cincinnati and an occasional meeting at a member's home. For our programs we have shown several sound films, also 2″ x 2″ slides of cacti. Articles have been read from such publications as the Cactus Journal, Cactus Digest, Saguaroland Bulletin, Cactus Chronicle, Epiphyllum Bulletin, also round table discussions by members, talks by members and guest speakers. We have a family style summer picnic at one of our local parks and a nice Christmas party. We have a door prize at each meeting.

JESSE C. SALZMAN, Cor. Secy.

ROOTING CUTTINGS

Want to know when your cactus cuttings have rooted? Try the method of Don and Gloria Bauer of the New Mexico Cactus and Succulent Society. Put cuttings in your favorite propagating medium in expendable glass containers. Degree of rooting can be seen easily through the glass and, when ready to pot, just break the container. There are always more mayonnaise jars!

FROM DETROIT, MICHIGAN

"The Spinal Column", bulletin of the Detroit Cactus and Succulent Society, announces that the Helin Tackle Company has placed a sign in front of the office at the corner of Beaufait and Gratiot Avenues indicating that a cactus exhibit is open for inspection facing the main highway US-25. Judging by the success of the "lures" manufactured by Charles Helin, the cactus exhibit should also lure many into collecting cacti and succulents! The address of the Detroit Society is 5260 Beaconsfield, Detroit, Michigan.

SPINE CHATS

LADISLAUS CUTAK

I'm tickled to hear that my CACTUS GUIDE is receiving favorable reviews in newspapers and magazines everywhere. On two occasions, however, the picture of the author sampling the pulp of the barrel cactus that appears on the inside jacket cover has brought criticism, stating that it was in bad taste. I assure you the portrait was not intended to be a gag picture of any kind or published to incite folks to go out in the desert and hack away at these curious vegetable growths. One of the reviewers places me in the category of those who set fire to Sahuaros and Joshua trees just to see them burn. Again I'd like to assure all that I'm not a vandal in any sense for conservation is strong in my heart. Several years ago I conducted research on the palatability of the barrel cactus pulp and shot a series of pictures along with it. Mind you, all this was done in sincerity and the results of the research and investigation were published in the Missouri Botanical Garden Bulletin for October 1943 and September 1946 issues, under the titles "The Life-saving Barrel Cactus —Myth or Fact?" and "Is There Palatable Water in the Barrel Cactus?" Unfortunately, both issues are now out of print but if anyone is interested in learning what my findings and honest opinions are in regards this controversial subject, I'm sure, will find the issues in various botanical libraries who file our monthly publication. I'm now wondering, if I tested the peyote cactus and wrote down my personal experiences for the reader, would I be classed as a dope addict?

* * *

Lobivia arachnacantha is a new species described in the Dutch organ, Succulenta, May-June 1956 issue by A. F. H. Buining and Ritter. It receives its specific name from the spider-like appearance on the spines. It is a depressed globose cactus, 4 cm. broad and 2 cm. high, with 14 ribs marked by prominent areoles bearing 9-15 radial spines which curve and lie almost appressed against the plant body. There is a solitary central spine of blackish color. Flowers are yellow and slenderly funnel shaped. The plant was found in Bolivia growing at an altitude of 2,000 m.

* * *

G. W. Reynolds describes a remarkable new species of Aloe in the April 1956 issue of the Journal of South African Botany. This aloe, *Aloe modesta,* was discovered by Mr. J. F. de Wet in February 1955 in Eastern Transvaal at an altitude of 6,900 feet. A striking character of the new species is that the flowers are densely congested in a subcapitate raceme, and are almost sessible, pedicels being at most only 1 mm. long. This unique character separates *A. modesta* from all other species in Leptaloe and Leptoaloe. Further, the leaves of *A. modesta* dilate and thicken below ground level, forming an ovoid bulb-like swelling which is a character of *A. kniphofioides,* but the latter has very different leaves, and red flowers.

* * *

J. C. Medina has an article in the April 1954 issue of Bragantia on the "Frequency and Severity of Leaf Cutting upon the Growth, Longevity and Yield of the Sisal Plant." This paper describes the results obtained with the sisal plant *(Agave sisalana)* in a cutting trial at Campinas, Brazil. It was found that a light cutting (30%) at 3- or 6-month intervals gave higher yields per area than any of the other treatments. Life cycle was slightly prolonged and significantly more leaves were produced per plant without adverse effects upon leaf weight and actual fiber content. The article is in Portuguese.

* * *

The cactus world mourns the death of Dr. Robert H. Peebles of Sacaton, Arizona, who died on March 25th last, at the age of 55. Many of our readers will remember him from the third biennial convention in Phoenix and by the excellent articles in the Cactus Journal. He also co-authored with Kearney "Flowering Plants and Ferns of Arizona"—a volume containing a complete description of the subject. Bob Peebles was also a very dear friend of mine and on several occasions I was his guest on field trips. He also tested and believed that the juice of barrel cacti could sate thirst in emergency. Although cacti were his avocation, his life-long work was with cotton. He lived, worked, and studied at the Sacaton Field Station of the U. S. Agricultural Research Administration for 32 years. I am told that Dr. Thomas H. Kearney, then superintendent of the Sacaton station, picked young Peebles out of the cotton patch "to be his first assistant in cotton breeding." He worked himself up to become an outstanding cotton specialist and superintendent of the station from 1945 to 1954. The deceased leaves behind his wife, Hazel M. Peebles, and three married children. To them go our sympathies.

* * *

The systematic position of the cactus family is controversial according to the views of different authors and hence the family has doubtful affinity. Early authors placed Cacti near the Saxafrages and Mesembryanthemums on account of the inferior ovary and parietal placentation in the first case and on the basis of apparently similar floral characters in the other. One author suggested relationship of Cactaceae with the waterlilies on the basis of seedling character and similarities in the floral structures with that of *Euryale ferox.* Recently another author (Neumann) established relationship of Cactaceae with Portulacaceae on the grounds of the same position of the microspore mother cells in young microsporangia. And so the controversy goes on. J. N. Mitra of the Department of Botany, Presidency College, Calcutta, writes in Science and Culture (February 1956) that the family Cactaceae should be placed under Ranales, basing his opinion from studies of the morphological characters of *Selenicereus grandiflorus* and *Opuntia dillenii* flowers.

* * *

For some time it was suspicioned that *Yucca arkansana* var. *paniculata* might be related to *Y. louisianensis* from which it differs only in having glabrous panicle branches. Thus Shinners in the January 1956 Field and Laboratory establishes the new combination, *Y. louisianensis* Trel. var. *paniculata* (McKelvey) by which the plant is now known.

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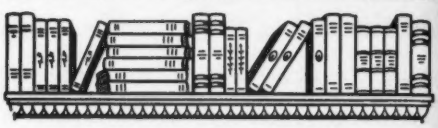

BRAZIL ORCHID OF THE TROPICS

This book by Foster is not an Orchid book as might be believed by the title. One of the finest travel stories illustrated with 145 beautiful illustrations and four color plates. Air plants and jungle gardens are exciting and many Bromeliads, Orchids, and Cacti are discussed and pictured. This 314 page book is bound in cloth and is still available at the original publication price of $4.40 postpaid. (Please add 17¢ sales tax on books delivered in California.)

BACK ISSUES OF THE JOURNAL

Many have written for a list of the back issues of the Journal so we are reprinting the price list below:

CACTUS AND SUCCULENT JOURNAL

The following complete volumes of the Cactus and Succulent Journal of the Cactus and Succulent Society of America are now available. Some of the early numbers are reprints but are complete (the inserts have been removed) with indexes. For bound copies add $2.50 each volume. Add 10¢ per volume postage in USA. Volumes delivered in California please add 4% sales tax. For a consecutive run of 10 or more volumes a 10% discount is allowed.

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